THE PHARMACEUTICAL INDUSTRY IN EGYPT

by

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ABSTRACT

This thesis is an assessment of the performance of the Egyptian pharmaceutical industry in the context of an international market for drugs which is dominated by the operation of multinational firms.

Chapter I begins with an analysis of the determinants of demand for drugs, followed by a definition of terms and a classification of pharmaceutical products according to their therapeutic usage and the technical processes involved in their manufacture. Section 3 of Chapter 1 describes the structure of the international market for drugs, exploring the major factors responsible for a significant rate of concentration in the industry, an excessive amount of expenditure on innovations and promotion, and unreasonably high prices.

Section 4 of Chapter I singles out the specific problems concerning developing countries in their acquisition of drugs and examines the arguments so far presented on the subject.

Chapter II traces the development of the Egyptian pharmaceutical industry from its early start in a free enterprise environment and through the 1950s when government control gradually became total.

Section 1 of Chapter III describes the changing pattern of supply of drugs by multinational firms in various markets. This is followed in Section 2 by a detailed analysis of the operation of multinational firms in Egypt, with special emphasis on their comparative gain from particular forms of investment. Section 3 of Chapter III identifies the costs and benefits derived by the Egyptian economy from the operation of multinational pharmaceutical firms, with a quantitative judgement of figures obtained for the two major kinds of foreign operations in Egypt: subsidiaries and license agreements.

Chapter IV gives an assessment of the performance of the nationalised domestic sector of the Egyptian pharmaceutical industry over the period 1960 to 1970/71, using indices for production, value added and profits as basic indicators. The price structure for drugs is

also examined for its influence on the profitability of domestic firms and on the production indices for the industry.

In Section 3 of Chapter IV the policy of GOPCA, the centralised government body in control of the Egyptian market for drugs, is assessed for its influence on the present and future growth of the industry.

Section 4 of Chapter IV is devoted to a close study of the problems which the industry has experienced with backward integration, as portrayed in the operation of the primary producing pharmaceutical chemicals plant, El Nasr.

Chapter V summarises the results of this study.

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My special thanks are due to Professor Edith T. Penrose, who supervised this work throughout the period of preparation and whose guidance and criticisms have undoubtedly contributed to a more thorough examination of the problems and data at hand.

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Chapter I

BACKGROUND TO THE STUDY

I. Introduction

The pharmaceutical sector is one of the youngest and fastest growing branches of the chemical industry, accounting on average for 10% for its total output in most industrialised economies. In those developing countries which are in the process of industrialisation, the production of pharmaceuticals accounts for an even larger share of the chemical sector's output,[1] the reason being that the bulk of pharmaceutical manufacturing requires relatively small capital investments, of the light as opposed to heavy industry type. One can also observe that many governments in such countries are giving special inducements to encourage the domestic production of pharmaceuticals which satisfy basic and immediate requirements in private consumption.

In the first quarter of this century, most drugs known to medical science were palliative in character - alleviating the symptoms of, rather than curing diseases - and their formulation took place in the pharmacy, using extracts of natural substances such as opium, quinine and digitalis. Today, the proportion of plant products (phytochemicals) represents a mere 5% of total pharmaceutical output,[2] having been superseded by synthetic, biological and biochemical preparations. The introduction for general use of such crucial remedies as sulpha drugs, antibiotics, vitamins, specifics

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1. United Nations Industrial Development Organisation, Secretariat, The Pharmaceutical Industries in the Second Development Decade, (ID/WG.37/2, May 2, 1969), p.5. This paper is among a series presented for the Expert Working Group Meeting on the Establishment of Pharmaceutical Industries in Developing Countries, Budapest, 4 to 10 May 1969, under the sponsorship of UNIDO.

2. Ibid., p.4.

for tropical diseases, hormones, dieuretics and tranquilisers only started in the mid-thirties, following a series of vital breakthroughs in pharmacological research and development.[1] These great advances in medical science originated in Western Europe and the United States, with the major pharmaceutical companies in those countries playing a leading role in the R&D efforts involved. Many of these firms branched into pharmaceuticals from other manufacturing such as general chemicals, dyestuffs, food, brewing and fermenting, where important discoveries were made in the use of their respective raw materials and/or production processes. With the prospects of a new and potentially enormous market for their products, these eventually giant firms were to set the pace for innovation in the ethical drugs field as well as influence its direction. The rate of innovation and of product obsolescence in the ethical drugs market is perhaps the highest in all manufacturing.

Pharmaceutical production consists of the application of a wide variety of technological processes to arrive at a few thousand drugs. Whereas the machinery and equipment used in some of the manufacturing processes may be easy to acquire and simple to operate, advanced professional skills are required continuously in all stages of production because of the paramount importance attached to the quality of medicaments. Furthermore, the sale and marketing of drugs takes place in a highly complex legal environment covering registration, licencing, patents, advertising and trade restrictions.

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1. For background reading on the discovery of modern drugs, see L. Earle Arnow, Health in a Bottle, J. B. Lippincott Co., Philadelphia, 1970. For a more summary account of the industry's development, see Organisation for Economic Co-operation and Development, Gaps in Technology : Pharmaceuticals. Paris 1969.

For all of the reasons indicated above, the production of pharmaceutical goods is concentrated in the industrialised countries. According to the study of UNIDO,[1] the share of developing countries in world production of pharmaceuticals was 9.5% in 1966. In the same year, again, a look at the figures for world trade in pharmaceuticals shows that 94.8% of world exports originated from Western Europe and the U.S., five countries alone accounting for 75.6% of these exports.[2]

The demand for pharmaceutical goods is closely related to the availability of health services. A simple way of measuring the disparity in per capita consumption of drugs between countries would be to look at physician density. In Europe and America, the number of patients per doctor is under 1000/1, in Egypt it is approximately 2000/1, India, 5,800/1, Indonesia 41,000/1, Nigeria 50,000/1 and Ethiopia 91,000/1.[3] But even this method of calculation underestimates the real gaps in per capita consumption, since it ignores the distribution of doctors and therefore medical services within countries. In developing countries, the density of doctors is much higher in urban as opposed to rural areas. The following figures give the number of patients per doctor for four countries:

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1. UNIDO, Secretariat, (ID/WG.37/2, May 2, 1969), p.25.

2. Organisation for Economic Co-operation and Development, Gaps in Technology : Pharmaceuticals, (op.cit. Paris, 1969), p.42.

3. C.R.B. Williamson, "Exporting Pharmaceuticals", in Innovation and the Balance of Payments: the Experience in the Pharmaceutical Industry, ed. George Teeling-Smith, (Office of Health Economics, London, 1967) p. 5.

Table 1. Distribution of Doctor Density in Four Countries

Country	Urban Areas	Rural Areas
India	500/1	40,000/1
Indonesia	2,800/1	6,000,000/1
Nigeria	2,050/1	59,000/1
Ethiopia	3,000/1	200,000/1

Source: Medical Care in Developing Countries (Office of Health Economics, paper No.44, London, 1972), p.26.

The health service in Egypt is typical of that in many developing countries.

Figures for Egypt show a notable improvement in the general availability of health services, both in terms of the growth in number of doctors and pharmacists in relation to the population, and in terms of the development in the consumption of drugs regionally.

The number of doctors and pharmacists has significantly risen so that population per physician has fallen from 5,170 in 1952/53 to 4,150 in 1960/61 and 1,990 in 1969/70 (Table 2). Similarly, population per pharmacist has fallen from over 25,000 in 1952/53 to 15,480 in 1960/61 and 6,900 in 1969/70 (population per pharmacy stood at 20,000 in 1969/70.)

Table 3 gives the regional distribution of drug consumption in Egypt in two comparative years, 1959/60 and 1969/70. The growth index over this ten year period shows a significant improvement in the regional distribution of consumption favouring those areas with the lowest per capita consumption. Consumption in Cairo and Alexandria thus grew by 185% and 210% respectively, while consumption in Lower Egypt and Upper Egypt increased by 325% and 423% respectively.

Table 2. Growth in Egyptian Population and in Number of Physicians and Pharmacists

Year	Population in Million	No. of Physicians		No. of Pharmacists		Population per Physician	Population per Pharmacist
		Graduates*	Total	Graduates*	Total		
1952/53	21.9	354	4238	53	870	5170	25220
1960/61	26.6	799	6393	260	1717	4150	15480
1961/62	27.3	851	7244	296	2013	3760	13540
1962/63	27.9	283	7527	314	2327	3700	12000
1963/64	28.7	935	8462	228	2555	3380	11220
1964/65	29.3	1042	9504	299	2854	3090	10300
1965/66	30.1	1201	10705	327	3181	2810	9470
1966/67	30.9	1290	11995	406	3587	2570	8020
1967/68	31.7	1676	13671	587	4174	2310	7590
1968/69	32.5	1339	15010	709	4473	2160	7290
1969/70	33.3	1690	16700	354	4827	1990	6900

* Figures give annual number of graduates from Egyptian Universities only.

Source: Statistics Department of GOPCA.

Table 3. Regional Distribution of Consumption of Drugs in Egypt, in 1959/60 and 1969/70

Region	Consumption of Drugs £.E. million		Growth Index		Population million 69/70	Number of Pharmacies 69/70	Consumption per Capita 69/70 £.E.
	1959/60	1969/70	59/60	69/70			
Cairo	6.550	18.720	100	285	4.961	636	3.77
Alexandria	2.002	6.315	100	310	2.032	212	3.11
Suez Canal*	0.503	0.677	100	134	1.023	48	0.66
Lower Egypt	2.652	11.278	100	425	13.745	401	0.82
Upper Egypt	1.551	8.120	100	523	11.193	303	0.73
Total	13.260	45.110	100	340	33.329	1600	1.33

* The relatively small increase in consumption of the Suez Canal region is due to the evacuation of civilians after the 1967 war. The estimate of the population living in that area in 1969/70 is therefore inaccurate.

Note: The Suez Canal region comprises the governorates of Port Said, Suez and Ismailia. Lower Egypt comprises the governorates of Damietta, Dakahlia, Sharkaya, Kalioubaya, Kafr Al Sheikh, Gharbeya, Menoufieh, Beheira. Upper Egypt comprises the governorates of Guiseh, Beni Suef, Fayoum, Menya, Assiout, Sohag, Kena and Assouan.

Source: Statistics Department of GOPCA.

Table 3 shows nevertheless very large and obvious gaps in per capita consumption between the two major cities and the rest of Egypt. In 1969/70, per capita consumption of drugs was £E.3.77 and £E.3.11 in Cairo and Alexandria respectively, while it stood at £E.0.82 and £E.0.73 in Lower Egypt and Upper Egypt respectively. These figures might be qualified to the extent that government health bodies might order supplies intended for rural areas from city based distributors. But as the proportion of drugs bought by government agencies out of total expenditure on drugs is only 30%, and more than half of this 30% is consigned to Cairo, Alexandria and the armed forces (see Tables 5 and 6),[1] this consideration will obviously not affect the central argument.

One can also observe that there are wide differences in the availability of pharmacies serving different regions in Egypt. Table 3 indicates that population per pharmacy is 7.8 thousand and 9.5 thousand for Cairo and Alexandria respectively, while the figures for Lower Egypt and Upper Egypt are 34.2 thousand and 37 thousand respectively.

The past few decades have seen a change in the public attitude towards health services in all countries: rich and poor alike now expect medical care to be provided on a collective basis. The reason for this change is twofold; on the one hand, the general rise in standards of living has led to the addition of medical goods to the consumer's budget necessities. Secondly, the great advance in medical science and its discovery of remedies to cure a great many ills means that medical care is no longer accepted as a palliative luxury for the rich who can afford it, but is held to be a basic right which,

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1. The General Organisation for Health Insurance benefits civil servants and workers in industry, the majority of whom live in the cities.

like education, should be available to every citizen.

Another factor favouring the socialisation of medicine is the random nature of disease. Unlike other necessities, the need for medical services is not equally distributed among the population, and it is widely felt that the burden of its material cost should be borne by the state. Health insurance is being introduced or expanded in most countries where it does not already cover the majority of the population. The British National Health Service represents one of the most comprehensive health insurance schemes in the West, having started as early as 1948. The U.S. is one of the latest countries to follow this general trend; in 1950 only 10% of the U.S. population was insured in some way, by 1967 80% of it was covered. It is estimated further that by 1975, approximately 63 million Americans will receive drugs without cost through Medicare.[1]

In Egypt, public expenditure on health has increased from £E.16.2 million in 1961/62 to £E. 50.2 million in 1969/70. This last figure includes expenditure on health insurance which was introduced in 1964 to benefit civil servants and workers in industry who contribute 1% of their salary or wages towards it. (The government or employer contributes about 3% of this wage). By 1970 more than 1.5 million Egyptians were covered in this way.[2]

The fast increase in government expenditure on health in Egypt has had an obvious and immediate effect on the growth in consumption of drugs. This is clearly shown in Tables 4 and 5. In the five year period 1964/65 to 1969/70, public expenditure on health rose by 40%

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1. J.J. Ingola, "Is Ethical Drug Marketing in Step with Medical Practice?", in Pharmaceutical Marketing, ed. Bernard G. Keller, Jr. and Mickey C. Smith (Baltimore: The Williams and Wilkins Co., 1969), pp.23-24.

2. Ministry of Health, Report on a Study in Health as a Productive Investment. Cairo, 1971, pp.19, 26-27. The death rate in Egypt fell from 19.6 per thousand in 1952/53, to 14.2 per thousand in 1969/70.

Table 4. Growth in Public Expenditure on Health in Egypt. £E millions

Year	Budget of Ministry of Health	General Org. for Health Insurance	Medical Treatment Organisation for Cairo	Medical Treatment Organisation for Alexandria	Total
1961/62	16.217	0.0	0.0	0.0	16.217
1962/63	23.026	0.0	0.0	0.0	23.026
1963/64	26.094	n.a.	n.a.	n.a.	n.a.
1964/65	28.789	4.388	0.050	0.039	33.266
1965/66	31.283	4.530	0.119	0.112	36.044
1966/67	32.659	4.275	0.249	0.247	37.430
1967/68	33.988	4.772	0.235	0.215	39.207
1968/69	36.869	5.304	0.558	0.277	43.008
1969/70	39.665	5.992	0.697	0.374	46.728
1970/71	41.463	7.149	1.106	0.525	50.243

Source: Ministry of Health, Report on a Study in Health as a Productive Investment, Cairo, 1971, pp.26-28.

Table 5. Breakdown of Total Expenditure on Drugs between Public and Private Purchasing Agencies. £E. millions

Year	Ministry of Health		Other Governmental Institutions				Chemist Sales (retail prices)	Total Expenditure £E mil.
	Rural Health Units	Hospitals run by Ministry	Health Insurance	Health Organisations	Armed Forces	Other		
64/65	1.216	2.613		1.785	0.476	0.100	24.810	31.000
65/66	1.617	3.421		2.097	0.699	0.155	26.010	34.000
66/67	1.710	2.472	1.110	2.242	0.751	0.192	26.122	34.600
67/68	1.865	2.383	1.417	1.891	0.794	0.210	24.615	33.240
68/69	2.714	3.241	1.964	2.363	0.891	0.230	26.298	38.140
69/70	3.125	3.715	2.816	3.142	0.966	0.246	31.100	45.110
% increase over period	157%	42%	154%	76%	103%	146%	25%	45%

Source: Statistics Department of GOPCA.

and total consumption of drugs rose by 45% Table 5 shows that public sectors - mainly rural health units and the health insurance organisation - were responsible for the major share of growth in total expenditure on drugs with rates of increase of up to 157%, whereas private consumption grew much less rapidly at the rate of 25%.

Many authors have shown interest in aggregate expenditure on health services or on drugs specifically as a percentage of national income for various countries, and try to explain or qualify their findings with normative judgements on what constitutes a desirable or adequate level. The observation that some poor countries spend a relatively higher percentage of their national income on the purchase of drugs is also found to be 'puzzling' or 'curious'.[1]

The attempt at deriving an international norm for percentage drug expenditure to income when countries vary so considerably in their per capita income would seem irrational since these very differences in per capita income would lead one to expect national differences in the proportionate expenditure on drugs needed by each country. As to the observation that poor countries spend relatively more of their national income on drugs than rich countries, this can be explained by the fact that drugs as a group constitute a basic necessity in a country's budget, and one can therefore expect the marginal propensity to consume drugs to rise more slowly than increases in national income, at least beyond the stage where the minimum necessary level of drug consumption is reached.

The above observation on the falling percentage of drug consumption to national income as income rises is also substantiated by figures

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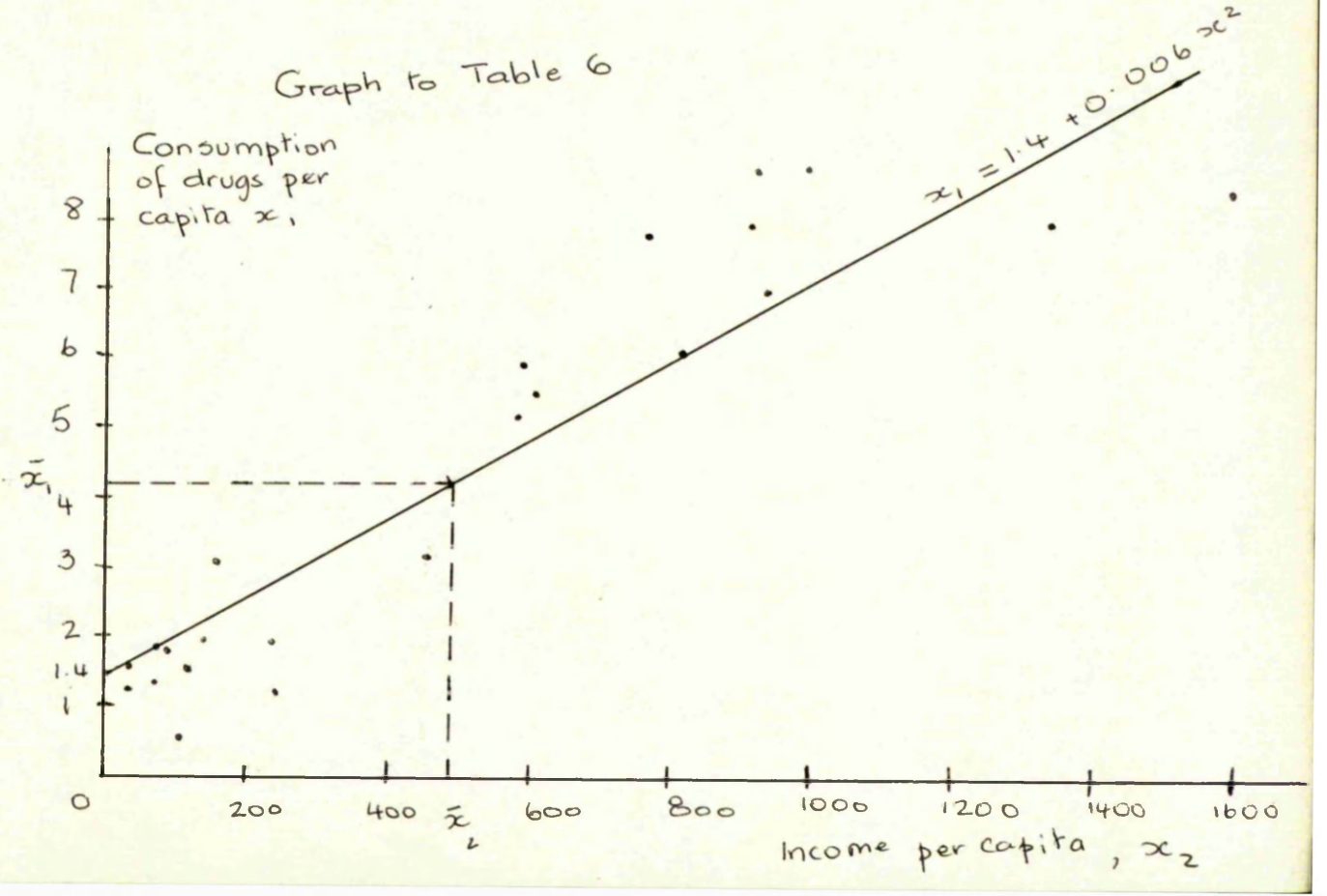
1. M.H. Cooper, Prices and Profits in the Pharmaceutical Industry, Pergamon Press, London 1966, p.151. Also, R. Titmus, Drugs in Our Society, and Social Policies and Population Growth in Mauritius (with B. Abel-Smith), 1961, both studies reported in M.H. Cooper above, p.151.

obtained from the World Health Organisation for 1969/70, as shown in the following Table.

Table 6. Drug Consumption and Income, Selected Countries 1969/70, values in £E.

Country	Income per Capita (1)	Consump. per Capita (2)	Percentage (2) to (1)	Country	Income per Capita (1)	Consump. per Capita (2)	Percentage (2) to (1)
Burma	29	1.52	5.23%	Libya	460	3.18	0.69%
Cambodia	39	1.23	3.15	Poland	587	5.23	0.89%
Egypt	75	1.37	1.82%	Hungary	597	6.00	1.00%
Brazil	80	1.91	2.39%	Czechoslovakia	610	5.50	0.90%
Tunisia	96	1.81	1.89%	Holland	770	7.80	1.00%
Irak	109	0.50	0.46%	Austria	820	6.10	0.74%
Jordan	121	1.51	1.25%	Switzerland	920	8,00	0.86%
Chile	142	1.99	1.40%	France	927	7.00	0.77%
Turkey	164	3.02	1.84%	Sweden	930	8.82	0.95%
Formosa	240	1.94	0.81%	U.S.	1340	8.00	0.61%
Mexico	244	1.15	0.47%	Kuwait	1602	8.47	0.53%

Source: Statistics Department of GOPCA, using figures obtained from WHO publications and the official rate of exchange, 1971.



The graph to Table 6 depicts the relationship between per capita income and per capita consumption of drugs across the 22 countries listed in Table 6. Any biases due to the use of official exchange rates are removed since we are only interested in the comparison of consumption to income in each country. Differences in prices of drugs between countries are also unlikely to affect the figures significantly for our purposes.[1]

A simple regression line fitted for the 22 observations gives the following coefficients,

$x_1 = 1.4 + 0.006x_2$ where x_1 = per capita consumption of drugs,

x_2 = per capita income

$R^2 = 0.85$ and R^2 = correlation coefficient

Although this fitted line oversimplifies the real shape of the graph, it does show a high intercept of 1.4 which conforms to our notion of drugs being a basic necessity. The graph also shows that expenditure on drugs remains fairly constant for a wide range of low incomes, so that the low income countries are spending a relatively higher percentage of their income on drugs.

The graph is also compatible with the idea that the minimum level of consumption per capita is for the more essential drugs in the low income countries, whereas people living in the richer countries are consuming drugs in both essential and luxury classes (such as anti-obesity drugs, tranquilisers and hormones), but this interpretation would ignore our previous observation on the consumption of drugs in poor countries which is much less evenly distributed among the population than in rich countries, with the possible result that consumption of luxury or unnecessary groups of drugs may be taking an equal share

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1. Figures in Table 6 should not, however, be taken as accurate descriptions of any one country's condition, since there are possibly some errors in individual estimates of drug consumption or national income.

of total drug consumption in both rich and poor countries.

2. Classification of Products and Terminology

Pharmaceutical preparations are not a clearly defined class of goods, and the nomenclature used to describe them varies greatly from one country to another. Although efforts are being made to standardise pharmaceutical statistics, there is as yet no strictly comparable international classification of products used for human health. Some preparations which are classed as pharmaceuticals in one country may be regarded as food or cosmetics in another. In Egypt, unlike Europe for instance, infant milk and baby foods are included in pharmaceutical statistics. Again, some figures for the value of production of the Egyptian firms we are concerned with in this study includes their output of veterinary preparations and toileteries, but as these two groups of non-human medicines together account for less than 3% of the total pharmaceutical sector's output,[1] the figures we are using will not be seriously affected.

There are three useful ways of classifying drugs for the purpose of our study, in order to define and analyse the products we are dealing with. The first classification is based on the therapeutic usage of drugs, the second relates to the marketing regulations governing their sale, and the third classification describes the stages of production involved.

a) Classification into Therapeutic Groups

Drugs can be classified into approximately forty five therapeutic categories, according to the type of illness or disorder that the preparation treats. The following therapeutic groups are of major importance in terms of sales volume and value to all countries: antibiotics, analgesics and vitamins. Advanced countries are moreover,

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1. Central Agency for Public Mobilisation and Statistics, The Pharmaceutical Industry, (No. 319-10, Cairo, December 1967), p.14.

greatly concerned with treatment of diseases of the heart, of the central nervous system and psychosomatic conditions. This translates itself into high levels of consumption of drugs in the following therapeutic groups: cardiovascular preparations, dieuretics, hormones, sedatives and tranquilisers.

The relative importance of different therapeutic groups in a particular country is supposed to reflect the disease spectrum of the population,[1] but this is only true among the developed countries where medical services are reasonably evenly distributed between different segments of the population. In almost all developing countries, the high incidence of parasitic infections, fevers, malnutrition and other specific regional diseases would suggest that the relative weight of therapeutic categories treating these diseases should be significant in such countries. Unfortunately, even in countries like Egypt which boasts a high doctor to patient ratio, a highly advanced pharmaceutical industry and a marked improvement in the regional distribution of medical services, we still find wide gaps between the actual and the necessary pattern of consumption of drugs in the different therapeutic categories. The following is a Table comparing the shares of high ranking therapeutic groups in terms of sales value for Egypt (in two different years) and the United Kingdom.

Table 7. Percentage of Total Market (Sales) Accounted for by Important Therapeutic Groups

Therapeutic Group	Egypt 64/65	Egypt 1970	U.K. 1964
Antibiotics	18	16	20.9
Vitamins	17	16	0;2
Hormones	8.2	7	10.7
Analgesics	7.5	8.4	9
Gastro intestinal	5.9	3	3.5
Broncho pulmonary	5.2	3.8	7.8

1. OECD, Gaps in Technology: Pharmaceuticals, Op.cit., p.67.

Table 7 cont'd

Therapeutic Group	Egypt 1964/65	Egypt 1970	U.K. 1964
Antiparasitic	5.2	1.1	-
Antidysenteric	n.a.	3.4	1.3
Sedatives and Tranquilisers	2.1	3.2	9.3
Sulphas	3.2	1.7	0.7
Cardiovascular	1.6	3.5	8.1
Dieuretic	n.a.	2.2	3.4
Ophthalmic	1.6	3.3	n.a.
Total	100.0	100.0	100.0

Source: U.K. figures from M. H. Cooper, Prices and Profits in the Pharmaceutical Industry, Pergamon Press, 1966, p.80. Figures for Egypt compiled from data in the Statistics Department of GOPCA and Central Agency for Public Mobilisation and Statistics.

Figures in Table 7 give the percentage value of expenditure on drugs in those therapeutic categories which account for the largest shares in total expenditure on all drugs.[1] Both ethical and non-ethical drugs are therefore included.[2] Differences in national classifications mean that we have had to regroup some of the therapeutic categories relating to the U.K. market, such as adding analgesic and anti-inflamatory groups to compare with the Egyptian figure which included both. All pharmaceutical categories accounted for in the totals in Table 7 are common to both Egypt and the U.K. except for one class which is included in the Egyptian total only - Infant Milks and Diets. But this last group accounts for only 2.5% of total Egyptian consumption in 1970 and does not therefore seriously affect our comparative analysis.

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1. See Appendix Table for complete Table of drug consumption according to therapeutic group for Egypt in 1970.

2. Ethical drugs are those drugs which are only advertised to the medical profession.

Whereas all vitamins are classed under one group in the U.K. market, the comparable figure for Egypt is obtained by adding four separate groups (single vitamins, complex vitamins, minerals,and vitamin and mineral combinations). It is obvious from Table 9 that the consumption of vitamins is significantly higher for Egypt at 16% than in the U.K. at 0.2%. This can only partly be explained by differences in needs for the treatment of vitamin and mineral defficiencies and is basically a consequence of self-medication by the majority of the population in Egypt. In Britain, the pattern of pharmaceutical consumption is much more closely related, often compulsorily, to medical prescription, which means that the British are not as likely as the Egyptians to self-administer fashionable and vigourously marketed products.

Another result of limited access to doctors and the subsequently greater invitation to self-administered drugs in Egypt is a great reliance on analgesics. This is not clearly reflected in the Table, because the group heading 'Analgesics' includes approximately 50% of British consumption of anti-inflamatory drugs to treat arthritis, a disease uncommon to Egypt.

Table 7 also seems to suggest that the consumption of antibiotics is higher in Britain than in Egypt, although one would expect the opposite situation to be true, because the incidence of infectious diseases is much higher in Egypt. But the difference in the figures for antibiotics in Table 7 is probably a result of the pricing policy of the Egyptian authorities towards that particular group of drugs. The most commonly used antibiotic preparations in Egypt are penicillin and chloramphenicol, and both types of drugs are expressly priced at manufacturing cost levels to ensure that low-income earners can afford them. Because the volume of these two groups of low priced drugs is a high proportion of the total class of antibiotics, the value of the

total class will therefore underestimate the physical volume of this group as a whole.

In Egypt again while vitamins and analgesics together account for 24.4% of total expenditure on drugs, for what are comparatively minor illnesses, the most serious and widespread diseases in the country remain relatively untreated as shown in the figure for anti-parasitics. The drug group 'Antiparasitic' includes both Anthelmintics and Antimalarials, two major groups of drugs used in the treatment of what are obviously the most widespread diseases in the country, but the percentage consumption for the total group is only 5.2% in 1964/65 and 1.1% in 1970.

The most widespread diseases in Egypt are Bilharzia, ancylostoma and ascaris, all three parasitic infections requiring anthelmintics for treatment (a sub-group under antiparasitic). Also serious are eye infections, tuberculosis, dysentry and the threat of malaria. The estimated percentage[1] of the Egyptian population affected by some of these diseases are:

Disease	1952	1960	1970
Bilharzia	46%	43%	36.1%
Ancylostoma	12.9%	11%	5.8%
Ascaris	45%	39.6%	26.1%
Tuberculosis	n.a.	n.a.	0.9%

A great deal of research has been done on the development of antibilharzia drugs, much of this work in Egypt itself. Although specific drug therapies have been developed to treat this disease, they are not very efficient (the patient needs continuous medical supervision during treatment), they are expensive, and by themselves useless if the patient is going to be immediately reinfected after treatment (Bilharzia only affects people living in rural areas). Another method

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1. Ministry of Health, Report on a Study of Health as a Productive Investment, op.cit., pp.5-6.

of combating bilharzia is the eradication of the snail vector inhabiting the edges of water streams by the large scale use of molluscicides. This method has proved extremely difficult to control and maintain and is again very costly. The only solution appears to lie in substantial improvements of the rural environment such as the extension of purified water to all villages and in educating the farmers to understand the causes and cycle of the disease. The annual funds needed to combat bilharzia have been estimated at several million Egyptian pounds.

It is widely held that "...the drugs needed for urgent therapeutic requirements are not necessarily those that will be profitable to manufacture ."[1]; and that "Production programmes based solely upon therapeutic needs are generally not profitable."[2] The reasoning behind this is that many of the vitally needed drugs have long been on the market, are therefore out of patent, are produced efficiently and are available on the international market at very competitive prices. Examples are penicillin, sulpha drugs and some of the anti T.B. drugs. The experience of Egyptian pharmaceutical firms bears out this important fact. Their return on the sale of penicillin, sulpha drugs, anthelmintics and antituberculosis drugs is negligible. Another reason is the fact that drugs treating serious diseases in poor populations will be purchased by central authorities like hospitals and health departments. Such institutional purchases are carried out in a very competitive climate and the prices arrived at are usually a small fraction of list prices used by firms in normal marketing of their products.

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1. UNIDO, Establishment of Pharmaceutical Industries in Developing Countries, Report and Proceedings of Expert Working Group Meeting, Budapest, 5-9 May 1969 (ID/35) (ID/WG.37/3), p.13.

2. Ibid., p.20.

This is true of most countries. It must finally be mentioned that demand cannot be directed into the desired consumption pattern by merely reorganising production programmes and making vitally needed drugs available at low prices. Demand for such drugs can only stem from an adequate system of health facilities and medical care.

b) Ethical versus Household Drugs

A second recognised classification of medicines distinguishes between those drugs which by law are advertised only to the medical profession (prescription or ethical drugs), and those which sellers are allowed to promote directly to the general public (household or proprietary drugs). Each of these two classes accounts for a substantial share of the total pharmaceutical market in all countries.

The class of ethical drugs can further be subdivided into two groups:

i) One group which is available by law only on a doctor's prescription, e.g. barbiturates;

ii) A second group of medicines which although advertised only to doctors, (and therefore used mainly on prescription), is nevertheless available to the general public to purchase directly should they so wish.

The proportion of ethicals in the second group is much larger in poor countries where there is no strict control on the sale of drugs. In Egypt for instance, one can purchase any antibiotic, hormone and most tranquilisers without a prescription; furthermore all prescriptions are returned to the patient who can use them time and again. Although the list of drugs which the chemist is required to dispense only on a doctor's valid prescription is very long, and the law is similar to the laws of Europe, it was found impossible to enforce it because of the economic hardship the patient would endure in being obliged to pay

for a doctor's services. Tight control is kept, however, on the attendance of a qualified pharmacologist at all times in the pharmacy to ensure some measure of advice and control of sales. In a study of chemist sales in Alexandria, it was found that two-thirds of drugs were bought without medical prescriptions, although a half of these were chosen on the advice of the attendant pharmacologist.[1]

One of the harmful effects of self medication has been the excessive use of antibiotics in the treatment of minor illness with the result that many disease organisms have become resistant to the antibiotics in common use. An example of this is the development of resistant strains of gonnococci which are responsible for gonorrhoea. The usual dose of penicillin - 1.2 million units of benzathine intramuscular divided into two doses in two consecutive days - is normally sufficient to treat the condition. In resistant cases however, larger doses of synthetic penicillin have to be administered.

Another consequence of self-medication in Egypt is the observed habituation and addiction of large numbers of people to sedatives in common use such as barbiturates.

Turning now to household drugs (sometimes referred to as proprietary or 'over the counter' drugs) this term applies to medicines which are advertised directly to the public and which by tradition are purchased without medical advice. They are mostly preparations used for minor disorders as compared to ethicals. Examples are analgesics (the most popular one of these is Asprin, Egypt alone consuming approximately 450 tons each year), cough and cold preparations, antacids, laxatives and vitamins.

In the marketing of both ethical and household drugs manufacturers can use either trade marks (brands, 'specialities') or the

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1. Interview with Dr. Abdou M. Sallam, Minister of Health, Cairo, 1971.

official names of the product (generic, approved names). Official names, like trade names, may apply to a single chemical or a mixture of chemicals in the same preparation. The chemical name of a substance describes its molecular structure and is therefore sometimes long and complicated, such as L-3-ketothreohexuronic acid for Vitamin C. Generic names are normally chosen by the originator of the drug and are coined so as to simplify the chemical name; phenobarbital is the generic name for the chemically described 5-ethyl-5-phenylbarbituric acid (chemical name).

There has been a long-standing debate about whether manufacturers should be forced to market their products under their generic name. Prohibiting the use of brand names is expected to simplify the job of the physician in recognising and choosing between drugs and would also reduce the monopoly advantages of firms able to maintain relatively large advertising budgets. Since the majority of prescriptions are written using brand names (in the U.S. 90% and in the U.K. 88.8% in 1965)[1], such a measure should have some effect on competitive conditions. But it must be remembered that in such markets as the U.S. and U.K., the level of duplication of drugs is small.

In the U.K., for instance, according to Cooper,[2] the average number of brand names per generic drug is only 1.1. Cooper also points out that the number of drugs for which there are equivalent preparations of the same generic composition are very limited (because of patents held on both the generic product and its brand name), but when equivalents are available, these are very large in number per generic composition. As a result, one can only expect an increase in competition due to the abolishion of brand names after the expiry of patent rights on any particular product.

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1. M. H. Cooper, Op.cit., p.94.

2. Ibid., pp.93-94.

For developing countries, this issue has perhaps greater implications, especially where domestic production of pharmaceuticals has made a start. The problem will therefore be reconsidered in the section on the domestic firms in Egypt and licence agreements, where it will be suggested that there is a definite advantage to the domestic firms of a developing country from the enforcement of such a law that limits producers to the use of generic names only.

c) Finished Products versus Raw Materials

Pharmaceutical goods in their finished form are medical preparations ready for administration in any of their possible dosage forms: tablets, capsules, ampoules, salves, syrups, powders, ointments or suppositories. The choice of a particular dosage form of a drug is as important as the choice of the basic drug itself (active substance or ingredient), to ensure the desired physiological response from its administration.

The processing of drugs into their final dosage form from ready made active ingredients is a very exacting science, if high standards of quality are to be maintained; variations in pressure in stamping tablets can cause changes in the rate of absorption of the drug, the application of coatings can determine whether the tablet can disintegrate satisfactorily. The choice of binders and auxilliary ingredients can also modify the onset, intensity and duration of the physiological response. Indeed, in quality control, there are a large number of tests that must be applied to ensure the purity, uniformity, and stability of the active ingredient and of course its freedom from contamination.

It is clear, however, that the machinery, equipment and production methods required for the formulation of drugs into their dosage form are relatively well known and standardised all over the world.

Improvements in such processes as freeze drying or the introduction of more efficient ampoule filling and sealing machines can be easily adopted within an existing laboratory at reasonable cost of equipment and know-how. It can also be observed that in the processing of pharmaceutical intermediates into finished drugs, there is no optimum size of laboratory; if one singles out any particular product, the firm seems capable of adapting its structure to marginal changes in output without affecting costs.[1] This is because formulation into dosage forms requires the same apparatus for different active substances and there is consequently great flexibility with respect to product mix (not between different dosage forms but between different active ingredients and hence basic drug for any given dosage form). It does appear, however, that the increasing sophistication in quality control procedures will make it difficult for the very small laboratories to absorb the high cost of newly developed equipment: "..., for operations such as quality control where analytical methods involving the use of costly instruments have become essential, the minimum effective level of investment has risen to some extent independently of imposed controls. Thus very small firms which have hitherto been able to maintain a competitive position in this sector will find survival increasingly difficult in the future."[2], and "... in the production of pharmaceutical preparations there have in the past been few obstacles to the involvement of small companies or new entrants. However, it does appear that the raising of standards of manufacturing practice, and the increasing cost of items, such as quality control, will increase the difficulties faced by very small firms."[3]

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1. National Economic Development Office, Focus on Pharmaceuticals, a report by the Pharmaceuticals Working Party of the Chemicals EDC, (a NEDO publications), London: Her Majesty's Stationery Office, pp.11-12.

2. Ibid., p.12.

3. Ibid., p.15.

The manufacturing processes used in the production of active ingredients (pharmaceutical intermediates), are much more varied and complex than those involved in the final processing of drugs. Bulk active ingredients used in formulation have their source in five basic types of production processes: chemical synthesis takes the leading share with 55% of total pharmaceutical raw materials (e.g. chloramphenicol, sulpha compounds, aspirin); fermentation, extraction from animal organs, and micro-biological processes present 40% of sources of raw materials (examples of each process are penicillin, insulin and vaccine production); and finally, the fifth type of process is the extraction of medicinal substances from botanical sources which accounts for 5% only of pharmaceutical raw materials.[1]

There are clearly defined stages of production in the manufacture of pharmaceutical intermediates, and it is wrong to think of the operations involved as one integrated process which the firm chooses either to undertake itself or delegate to other concerns. The manufacture of bulk ingredients is split into a host of consecutive and fairly independent steps, each step of backward integration involving greater specialisation (less flexibility), relatively larger investments in installations and machinery, higher capital/labour ratios, more economies of scale, and greater dependence on the output of other industries (which is especially true of chemical synthesis).

The primary stages of production of synthetic medicinal chemicals require a corresponding development of the chemical sector of any given country because of the strong dependence of each pharmaceutical chemical

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1. A Sectoral Study on the Pharmaceutical Industry, document prepared by a Group of Experts for the Asian Conference on Industrialisation, held at Manila, Philippines, from 6 to 20 December 1965, under the sponsorship of ECAFE with the co-operation of the United Nations Centre for Industrial Development (UNIDO), E/CONF.54/R.B.P./2, United Nations, New York, 1966, p.468.

output on a large number of fine chemicals as inputs. Production methods and the technology needed for the operation of pharmaceutical chemicals plants are also very similar to those available in advanced chemical industries.

3. The International Market for Pharmaceuticals

a) Concentration

Both world production and world trade in pharmaceuticals are concentrated in a small number of countries in the West. According to a UNIDO report,[1] world production of pharmaceuticals in 1965 was estimated at 12.7 billion U.S. dollars, and OECD figures[2] for the same year show that production undertaken in the OECD area (excluding Switzerland) amounted to 9 billion U.S. dollars, almost three-quarters of world production.

The following Table[3] describes world exports of pharmaceuticals, but the foreign operations (subsidiaries and license agreements) of international firms belonging to the five major exporting countries is growing at a much faster rate than direct exports, and explains the apparent decline of the U.S. trade position.

Table 8. Percentage Share of World Exports of Pharmaceuticals

Year	U.S.A.	W.Germ.	U.K.	Switz.	France	Other OECD.	Rest World	Total
1954	39.1	7.8	15.0	n.a.	10.4	11.0	0.7	100
1965	20.0	17.6	14.7	14.3	10.8	21.4	1.2	100
1966	18.8	18.1	14.3	14.1	11.3	21.7	1.7	100

Source: "Trade in commodities, Series C", and "World Trade Annual", Division 54 : Medicinal and Pharmaceutical Products, OECD Publications, Paris, 1967.

1. UNIDO, Secretariat (ID/WG.37/2, May 2 1969), p.25.

2. OECD, Gaps in Technology: Pharmaceuticals, Op.cit., p.32. Note the mistake in the heading, where thousands should be substituted for millions.

3. Ibid., p.42.

According to R. C. Fenton,[1] the world market for ethical drug sales excluding the U.S. and Communist areas, was of the value of 3.5 billion U.S. dollars in 1963, and U.S. companies and their foreign subsidiaries accounted for 20% of this value.

The concentration of production is also significant within the national market of each of the major exporting countries, although this fact is sometimes obscured because of the large number of products and producers engaged in pharmaceutical manufacture. If one narrows down the national market to individual therapeutic groups, concentration is even more substantial than for the drug market as a whole. The U.S. is the largest manufacturer and supplier of drugs internationally. Its pharmaceutical industry was composed of 1,600 companies in 1965, ethical drug sales amounting to 2.5 billion dollars.[2] Yet, according to a study by William Comanor,[3] the total U.S. ethical drugs market can be described as type II oligopoly (where the largest 8 firms account for at least 33% of industry output). Furthermore, when analysing particular therapeutic classifications (for which the cross elasticities of demand approach zero), Comanor found that in twenty such markets, the proportions of output accounted for by the leading 5 firms ranged from 56% to 98%, describing type I oligopoly (where the largest 8 firms account for at least 50% of industry output).

This highly skewed distribution of firm size is characteristic of the market in all advanced countries. In Britain, with 320 firms, 10% of firms account for 70% of turnover; in Italy, with over 700 firms,

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1. Richard C. Fenton, "Worldwide Ethical Drug Markets", in Pharmaceutical Marketing, Op.cit., p.304.
2. A. Mason Harlow, "Pharmaceutical Marketing and the Public Interest in Perspective", in Pharmaceutical Marketing, ed. Keller and Smith, Op.cit., p.239.
3. William S. Comanor, "Research and Competitive Product Differentiation in the Pharmaceutical Industry in the United States", in Economica (November, 1964).

25% of firms account for 90% of turnover; in Germany, the bulk of turnover is concentrated in 17% of firms.[1]

Despite a tendency for the larger companies to grow at a faster rate than the industry average (either individually or through the process of amalgamation), and for small companies to be driven gradually out of the market (in France the number of companies has declined in fifteen years from 2000 to 800),[2] there remains in all countries a considerable proportion of small firms. In Britain, 63% of firms employ less than 25 people; in Italy, 300 firms have less than 9 employees; in Japan, 571 firms (out of a total of 1306) have less than 10 employees.[3]

The emergence and survival of such small companies alongside the giants of the industry illustrates the fact that a large part of pharmaceutical production is very economical on a small scale.

b) Production Costs

A great number of drugs can be produced in small quantities comparatively cheaply. This is true of two main kinds of production: the first is the final processing and packaging of most drugs, and the second is the complete manufacture of those drugs for which the total market is small.

The majority of small pharmaceutical firms tend to purchase ready-made basic substances in bulk (most active ingredients are available as intermediates in powder form), and confine their operations to those of formulation into dosage forms and packaging. Several representatives of medium sized companies[4] have expressed the opinion that it was even

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1. OECD, op.cit., p.p.47-49.
2. M. H. Cooper, op.cit.,p.62.
3. OECD, op.cit., pp.47-49.
4. Interviews with representatives of 'Reckitt & Colman' in the U.K., 1971, and of 'Alexandria' and 'CID' companies in Egypt, 1971.

cheaper for the tiny laboratory to perform such processes as tabletting or admixture of solutions because these small establishments do not bear the high overhead costs (administration, coordination) which running a large enterprise involves. This suggests the possibility that long run marginal costs of manufacturing remain fairly constant for a wide range of output in the formulation of drugs. But it is difficult to believe that a larger enterprise specialising in these final stages of production (processing into dosage forms and packaging) could not be made to run more efficiently than small businesses and effect the savings which one would expect from the economies of large scale production, such as in bulk purchases of raw materials and in transport costs. A more plausible explanation for the profitability of such great multitudes of very small and sometimes inefficient sizes of pharmaceutical firms is the well documented fact that variable costs are an extremely low proportion of total costs in the production of pharmaceutical goods,[1] and this, together with the lack of price competition in the market for drugs means that higher costs of production due to inefficient size will have a negligible effect on total costs and competitive position.

There is evidence that the recent entry (a totally new trend) of the large firm specialising in the formulation of generic drugs into the American market is posing a real threat to the small producer; McKesson & Robbins, hitherto the largest drug wholesaler in the U.S., has decided to integrate backwards into formulation and packaging and "has promised to undersell the low price operators already in the field."[2]

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1. William S. Comanor, "Research and Competitive Product Differentiation in the Pharmaceutical Industry in the United States", Op.cit., p.375.

2. Christopher A. Rodowskas, J. "Competition in the Pharmaceutical Industry", in Pharmaceutical Marketing, Op.cit., p.145. Evidence of important economies of scale in the storage of pharmaceuticals will be given on pp.173-174 of this thesis.

Although the majority of small pharmaceutical firms engage in the last stages of production only, a significant number of these are highly specialised and integrated in their field of manufacture. In almost all therapeutic categories there are numerous examples of drugs which can be produced efficiently on a small scale: in ophthalmic, cardiac and dermatological classes, for example. Such specialised small laboratories usually carry out a large amount of research and development on their products. Studies show that in the manufacture of drugs for such narrow but specialised segments of the market, there is no tendency "for the large enterprises to spend, necessarily, more on research and development in proportion to their turnover than the small, and above all, the medium sized, enterprises."[1]

Looking at the production of the small group of giant firms in the pharmaceutical industry, there is a high degree of manufacturing specialisation.[2] To take an example, Squibb, the eighth largest American firm in terms of sales has the fourth broadest line of products on the market, with 227 different drugs in 304 different formulations and 435 different package sizes. Yet Squibb is fully integrated with respect to few of its products. Out of a total of 51 drugs representing at least two-thirds of the total value of all U.S. output of ethical drugs in 1958, Squibb sold nineteen but produced only seven.[3] This firm produces some of its antibiotic products preparations from their very primary stages, examples are nystatin, streptomycin and penicillin potassium G.

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1. UNIDO, Secretariat (ID/WG.37/2, May 2 1969), p.8.

2. Richard M. Furlaud, "Statement before Senate Subcommittee" in Pharmaceutical Marketing, Op.cit., p.162.

3. U.S. Senate Report, Administered Prices, Drugs, 1961. U.S. Government Printing Office, Washington, 1961, p.67.

In the production of eight vitamins, sulfadiazine, and tetracycline, Squibb relies entirely on the purchase of the active ingredients in bulk form from other large establishments, and confines its operations to formulating, packaging and marketing these drugs under its own brand names.[1] This pattern of interdependence characterises the entire range of firm sizes and is in reality a lot more complex than described here, because, as mentioned earlier, the production of pharmaceutical raw materials is itself segmented into many separate stages and backward integration can be extended to embrace as many steps or processes as a firm may need to.

Judging from the wide spectrum of firm sizes in the pharmaceutical industry and from the magnitude of interdependence across its whole range, one can infer with some confidence that economies of scale in the production of pharmaceuticals are largely unimportant as a barrier to entry.

c) Innovation

In a market characterised by a highly inelastic demand for existing drugs, and a lack of size/cost advantage in capital requirements or manufacturing techniques, the absence of some other form of entry barrier like product differentiation would send the pharmaceutical indsutry into intense price competition,[2] and bring pressure on profits. It is generally agreed that the leading pharmaceutical firms in the West have pursued a policy of competitive innovation to ensure the security of their position of oligopoly.[3] High research and development

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1. U.S. Senate, Ibid., p.67.
2. This happened in the case of penicillin and streptomycin, neither protected by patents; the price of 10 mil. units of penicillin fell from $60 in 1945 to $4.75 in 1950 to $0.21 in 1960. Similarly, 10 grams of Streptomycin fell in price from $160 in 1946 to $3.15 in 1950, to $0.36 in 1960.
3. William S. Comanor, Op.cit., pp.372-375.

expenditures have provided the means of furnishing the firm with a continuous flow of new products, and the patent system has allowed the legal enforcement of restrictions on entry to their market.

This trend for the rapid introduction of both major advances and minor modifications to existing therapeutics was accelerated in the 1950s and early 1960s with the result that in Britain for instance, the number of branded preparations as a percentage of prescriptions rose from 16% of the total in 1949 to 68% in 1963 and 73% in 1966.[1] When it is remembered that there are some 3000 drugs available for prescription on the National Health Service[2] and that their average duplication ratio is 1.1 brands per official name , the extent of product differentiation becomes evident.

In the U.S., William Comanor has shown that in the ten year period 1951 to 1960, 57 firms introduced 4,632 new products. Of these, 432 were new chemical entities, 760 duplicate products, 1,064 new dosage forms, and 2,376 compound products (combinations of drugs already on the market). This last type of preparation is the least desirable from a medical point fo view, and there is much criticism of the fact that the U.S. law allows the issue of new patents for mere combinations of old products.[3]

Nevertheless, while these laws still stand, companies make full use of them. Between January 1972 and November 1973 three American companies alone - Squibb, Merck and Upjohn - filed 349 international patents, at a cost of £15 million which they claimed as part of their

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1. Report of the Committee of Enquiry into the Relationship of the Pharmaceutical Industry with the National Health Service, 1965-67, (Sainsbury Report), Cmnd. 3410, London, HMSO., 1967, p.25.

2. Ibid., p.5.

3. Henry Steele, "Patent Restrictions and Price Competition in the Ethical Drugs Industry", Journal of Industrial Economics, 12:198, July 1964.

research and development budgets. According to the testimony of Dr. Robert Aries as to the new Senate subcommittee investigation the American drug industry, very few of the patents filed are original. In 1972, only 45 out of 1,500 patents registered internationally - by American companies in two other countries - were genuine new drugs.[1]

The pattern of research in the industry is also directed towards making patents unassailable. Drug companies claim that they face odds of 3000:1 against finding clinically useful drugs, and that only one in 5000 pharmaceutical compounds tested succeeds commercially. But these odds are greatly inflated by the synthesis and testing of compounds made necessary only by consideration of patents. Because any new drug discovered almost always leads to a host of structurally similar but separately patentable imitations, too much emphasis is placed upon strengthening the patent by synthesising and screening a whole series of chemicals related to the first active compound. It has been shown that in a series of up to 475 tests, the chances of finding a successful marketed compound within the first 40 tests of the series was 82%, clearly a reflection that a tremendous amount of chemical and pharmacological effort is wasted except for the purpose of acquiring patents.[2]

High rates of product obsolescence in the industry are a direct outcome of competitive innovation, and in many cases are self-imposed by firms in their attempt to improve their position in any particular therapeutic market. The following Table is adapted from the results given in an article on the product life cycle of ethical drugs.[3]

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1. The Economist, February 16, 1974, p.88.

2. John R. Vane, A Plan for Evaluating Potential Drugs, Chap.2, of Evaluation of Drug Activities: Pharmacometrics, Academic Press, London and New York.

3. William E. Cox "Product Life Cycles as Marketing Models", in Pharmaceutical Marketing, ed., Op.cit., pp.76-80.

Cox's model is based on a sample of 754 ethical drugs introduced in the U.S. market in the years 1955-1960.

Table 9. Life Cycle of Ethical Drug

Stages of Product Age	Length of Time between Stages
Catalog Birth (product is introduced in the catalog of the firm)	1 month (median)
Commericial Birth (product attains 5000 new prescriptions in one month). Only 41.5% of products reached commercial birth	6 months (average)
Maximum Monthly Revenue	20 months (median)
Commercial Death (monthly revenue of product declines to 10% of maximum reached)	

As apparent from the Table, the typical ethical drug life is just over two years. The dangerous threat which such unreasonable proportions of new introductions is posing has been emphasised by a leading pharmacologist[1]: "In the past the pharmaceutical industry has shown admirable restraint, but such restraint no longer exists... Excessive numbers of drugs are now being introduced - excessive in view of the working capacities of those competent to test their safety and utility in man, excessive in view of the subjects available for the testing of their effects, dangers and uses in man, and excessive in view of the ability of those who must assimilate the essential knowledge and learn how to prescribe them effectively and safely, rationally rather than routinely."

d) Marketing

A major deterrent to true competition and an important factor in maintaining high retail prices in the international pharmaceutical market is the high cost of promotion.

Advertising practices of the large pharmaceutical companies have received the attention and criticism of most writers on the subject.

1. Walter Modell, "The Drug Explosion - An Editorial", in Pharmaceutical Marketing, ed., Op.cit., p.261.

Promotional expenditure is considered excessive in proportion to other outlays of the large firm, and it often is the case where advertising costs are as high or higher than research cost, themselves a considerable proportion of sales revenue. In Britain, in 1965, the industry spent 17% of sales on distribution and sales promotion, as compared to 9.7% on research and development.[1] The Kefauver investigations showed that in 1958 the American companies spent 24.8% of the industry's total sales on advertising and selling expenditure, as compared to 6.3% on research. In 1964, the American industry is further reported to have increased the percentage of sales spent on distribution and promotion to 35%.[2] The actual figure involved represents an average promotional outlay of $3,000 per prescribing physician per annum.

When one considers the physician population, a small homogeneous and clearly defined group as the firm's customer, even the most comprehensive marketing effort aimed at making a product known would need to be only a modest proportion of actual outlays.

Advertising to a trade (in this case, physicians) is known to be much cheaper per unit of sales than advertising to the ultimate consumer. However, an American manufacturer justifies the large expenditure by saying: "If we think of the physician as our customer, our market is small numerically, but our potential sales per customer are so large as to justify a very considerable promotional effort."[3] But admitting that the money is only spent because more than enough is available is obviously also an admission of an unhealthy market situation resulting from an oligopolistic domination.

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1. Sainsbury Report, Op.cit., p.108.

2. Scherer, F.M. Industrial Market Structure and Economic Performance, Rand McNally and Co., Chicago, 1971, p.329.

3. Richard L. Hull, "Marketing Concepts", in Pharmaceutical Marketing, ed., Op.cit., p.5.

Although marketing expenditure are far above the necessary level to inform the prescribing public, their magnitude has served the giant companies as the most effective barrier against the entry of the smaller firms into the pharmaceutical market. Large firms in the industry have thus increased the normal advantages which their size offers them in advertising costs. They have inflated the minimum threshhold level necessary for an advertising campaign to be effective, so that small firms need to spend ridiculous sums on advertising in relation to their turnover if they are to make any impact on the ethicals market.

Because economies of scale in production are unimportant to the pharmaceutical industry, average production cost gives a minimum optimal size of firm which is small in relation to the size of the market. But massive advertising costs, when added to average production costs gives an average total cost curve which has a minimum point at a much higher level of output. Small firms are therefore unable to compete in the largest segments of the market which are dominated by the big firms' brands, and compensate for their inability to match the advertising budgets of the giants by offering their products at prices which are substantially lower than those of the leading firms.

e) Prices

The few dimensions covered so far have obvious implications for pricing. Prices in the pharmaceutical industry are characterised by their lack of relationship to costs of production and by their great rigidity, two essential aspects of oligopolistic price behaviour.

Although it is difficult to construct a comprehensive index for the price level of drugs,[1] one can make several observations which apply to the majority of drugs and which have been verified.

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1. A general price index would require stability in the share of different drugs in the total and would ignore the importance of new drugs which are continuously introduced.

i) There are significant price differentials for the same drug as between manufacturers, branded products being higher priced than generics. H.D. Walker discovered in an analysis of 656 ethicaldrugs that the prices of branded, advertised preparations were two-thirds higher on the average than the price of equivalent drugs sold under their generic names.[1]

ii) There is considerable price discrimination by manufacturers among different markets, and among different buyers within the same market. Studies of price,levels for the product of a single manufacturer in different countries have often revealed vast differences in pricing. The latest case to be given coverage in the press is the price of Beecham's Ampicillin which is sold in France for $2\frac{1}{2}$ times its level in Britain.[2]

It is also a general rule that in all countries, large institutions are powerful buyers which are conscious of price differentials and are therefore favoured with lower prices by manufacturers.

iii) The price trend for any particular static group of drugs is downward, because the expiry of patents introduces new competition and forces a reduction in the prices of existing products. But the average price level for any group of commonly used drugs treating a particular disease shows an upward trend, because new products displacing older drugs are much higher priced. A good example is the group of antibiotics.

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1. Hugh D. Walker, "Market Power and Relative Prices in the Ethical Drug Industry", Abstracts of Econometric Society Papers, Dec. 1967, meetings, pp.73-74.

2. The Guardian, April 1974.

4. The Case of the Developing Countries

The pharmaceutical industry in the West has been thoroughly investigated, but there has been little published work on the problems facing developing countries in the acquisition of drugs.[1]

The demand for drugs in most developing countries can be expected to rise at a higher rate than the demand for any other single consumer good, because of the disproportionate increase in those segments of the population having access to medical care, of the acceleration of government expenditure on health, and of the increased awareness of the public of the existence of remedies.

This is clear in the case of Egypt for instance, as shown by a comparison of the development of consumption levels for various basic consumer goods.

Table 10. Index for Growth of Consumption of Basic Commodities in Egypt, 1952-1970

Year	Drugs	Grains	Fabrics	Sugar	Fruit	Vegetables	Oils and Fats
1952	100	100	100	100	100	100	100
60/61	307	112	109	114	129	149	132
64/65	639	175	207	131	197	215	178
69/70	930	198	234	148	223	244	202

Source: Statistics Department of GOPCA.

Given the near monopoly over supply of ethical pharmaceutical goods by international companies based in industrialised economies, developing countries have an obvious interest in finding means of obtaining drugs on better terms. But before settling on a particular strategy, developing countries must be fully aware of the essential

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1. Notable exceptions are C.V. Vaitsos, Transfer of Resources and Preservations of Monopoly Rents, Economic Development Report, No. 168, Development Advisory Service, Center for International Affairs, Harvard University, Cambridge, Massachusetts, 1970. Also the general survey and papers presented to the UNIDO meeting on the Establishment of Pharmaceutical Industries in Developing Countries, Op.cit., (ID/WG. 37/3), 1969.

differences between their own pharmaceutical markets and those of the more advanced countries.

One aspect of a developed pharmaceutical market that developing countries have still to realise is the greater degree of competition created by the large number of efficient small firms operating in technologically advanced countries. These firms specialise in the production of standard unbranded drugs. The expiry of a patent is quickly followed by the appearance of much lower priced generics from the small companies to compete with the original product from the larger, initiating company. But this benefit is only slowly transferred to developing countries because these companies are too small to afford to market their products internationally.

Even in their home market, these small firms are unable to sell their products to the private sector because of the barriers to entry which the larger companies have erected with their huge marketing and advertising outlays. As a result, the sale of low priced generics is concentrated on supplying bulk buyers such as government agencies. In the U.S. for instance, the bids of military establishments and state hospitals come to these small competitive producers.[1] The list of pharmaceutical manufacturers who have met the inspection requirements of the Defense Supply Agency and are authorised to submit bids for contract from the government is very long. There are over 500 such "responsible prospective contractors".

One of the very useful suggestions made by UNIDO in its summary recommendations is that developing countries "should consider channelling most of their import and domestic buying ... through a central

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1. See Christopher A. Rodowska, Jr., "Competition in the Pharmaceutical Industry", p.144; Regina Brown "The New Shape of the Medical Market", p.104; and F.D.C. Reports, "Two Dominant Trends in Wholesale Drug Business", pp.90-91 - All in Pharmaceutical Marketing, Op.cit.

agency and purchase commonly used drugs in bulk for greater economy."[1]

But the above measure does not apply to developing countries alone, since many nations that are concerned with the cost of drugs to their public have considered such centralised control of purchases. In Britain since 1957, the National Health Service has operated a Voluntary Price Regulation Scheme for drugs commonly presented on the N.H.S., with the result that the price level for drugs on the British market is reported to be lower than in most other countries in the West.[2] To achieve savings of any magnitude, the central purchasing agency must develop a system of price control to complement its role of monopsonist.

The centralised purchasing agency can adopt one or more possible measures to obtain competitive prices, both from foreign and domestic producers. One criterion widely used by governments for fixing the price of drugs from a foreign producer has been the requirement that this price must not exceed the price charged for it by the producer in the country of origin. The opposite criterion is likewise used by other countries. In Britain for instance, until 1959, the export criterion was a formula whereby the purchase price to the National Health Service must not exceed the average export price to other markets. This formula was criticized by the Sainsbury Committee because it assumes that prices in international markets are competitive. "...certain of the formulae, and particularly the export criterion, must be viewed with some suspicion in a world industry operating within an international network of patents."[3]

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1. UNIDO, Op.cit., (ID/WG. 37/3), p.13.
2. M.H. and A.J. Cooper, International Price Comparison, A study of prices of pharmaceuticals in the U.K. and eight other countries in 1970, prepared for the Pharmaceuticals Working Party of the Economics Development Committee for the Chemical Industry (NEDO publication), London, August 1972, p.11.
3. Sainsbury Report, Op.cit., p.31.

After the publication of the Sainsbury Report, a new Voluntary Price Regulation Scheme was introduced in the U.K. in 1969. Price negotiations are now based on the Company's profits on sales of N.H.S. products in the U.K. alone. Firms supply the Department of Health and Social Security with details of sales, costs and capital employed for the previous year. Negotiations take place on the basis of these, taking account of the company's advertising expenditure, transfer costs of materials between affiliated concerns, and a degree of the parent company's foreign research and other expenditure.[1]

Another method of fostering competition is by inviting tenders for bulk supplies of basic generic preparations. In this respect, developing countries should be made aware of the existence of little known but reliable foreign producers who offer their products at a small fraction of those advanced by the giants in their home market. There seems to be no reason why these small efficient firms in the West should not be approached as sources of potential supply.

Because of the imperfections of the market, the price charged by one firm will vary substantially from one country to another, being a function of potential competition in each market. Since the majority of developing countries do not have a national pharmaceutical industry, potential competition is greatly reduced and the prices of foreign drugs can be expected to be higher than in developed markets. Centralised purchasing can therefore be a valuable means of obtaining lower prices, and bargaining strength becomes the decisive factor affecting the terms reached from negotiations.

A second aspect of a developed market that developing countries must take into account is that the monopoly elements in drug manufacture stem from the patented results of research and from know-how, which

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1. See M.H. and A.J. Cooper, International Price Comparison, Op.cit.

are two very scarce resources in developing economies. This means that antitrust legislation designed to weaken such monopoly elements can only be effective if it is carried out by countries with sufficiently developed home industries to take advantage of such weakened protection of the multinationals.[1] For example, government restrictions on the issue of patent s, reductions in the period of patent protection, or compulsory licensing, are all expected to lead to the entry of more firms into themarket for patented products, with a resulting increase in competition. But such measures can only have a significant impact if they are initiated by the governments of the more technologically advanced countries.

A case in point is Italy which is the only country in Western Europe that does not recognise patents in drug manufacture, and where therefore, neither processes nor products are patentable. The result is that Italian firms are quick to copy any newly discovered drugs using the most efficient manufacturing techniques, because they do not need to circumvent the patent. To Egypt, for instance, the Italian pharmaceutical industry has been the cheapest source of pharmaceutical active ingredients in bulk form, the prices of which are used by Egyptian firms in negotiating with the multinationals over the purchase of raw materials for final processing.

On the other hand, a less developed country like India has limited scope for taking advantage of a weakened patent system, without

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1. It is important not to confuse the present argument about the influence of patents on the domestic industry of a developing country with the ability of a centralised purchasing agency to buy drugs from non-patented suppliers. Purchasing from unlicensed sources can and does happen whenever a central purchasing body has sufficient evidence of excessive prices by patentees. This occured with Tetracyclin for instance in Britain, the U.S. and Egypt at varying dates.

all of the sophisticated technical resources. It has been pointed out by Kust[1] that after eight years of operating compulsory licensing provisions in India, very few applications were made by indigenous firms and only one was granted.

Patents in Egypt are for processes only, so that alternative methods of production for a given product have sometimes been sought as a means of reducing cost. This was forcefully demonstrated by the Egyptian acquisition of Russian technology for the manufacture of chloramphenicol, the second most important antibiotic on the Egyptian market both in volume and value. Parke Davis had discovered and patented the drug only eleven years before, in 1947, so that its price was still very high on the international market. The cost of manufacturing chloramphenicol using the Russian technique proved to be considerably higher than the price of the product in its bulk powder form when later available on the international market.[2] It is sometimes cheaper in the long run to pay for direct access to documentation on original research and development than for possibly inefficient substitutes.

It is interesting to consider why the Egyptian government decided to continue to observe international patents and not to follow the Italian or the Indian[3] example. The basic reason seems to be that technical know-how from foreign patentees is thought to be a sufficiently valuable commodity to pay for voluntarily rather than to use

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1. Kust, Matthew J., Foreign Enterprise in India: Laws and Policies (University of North Carolina, 1964), as mentioned in Edith T. Penrose "International Patenting and the Less-Developed Countries", The Economic Journal (Sept. 1973) Vol.83, p.778.

2. See Chapter IV, Section 4 for more details.

3. India has significantly weakened its patent system. In 1970, patent protection was reduced from 16 to 7 years, product patents were abolished, and compulsory licensing was allowed after 3 years for a royalty not exceeding 5% of value of production.

unreliable immitations as shown in the above example. Both patented and non-patented technology must be paid for either directly or indirectly, and the Egyptian authorities, although recognising the right of patent owners have nevertheless legislated against the abuse of patents or excessive profits. Royalty payments are limited to a maximum of 5% on sales, while prices of raw materials delivered to licensees may not be more than 10% higher than competing international prices from licensed or unlicensed sources. The Egyptian government also stipulates that all patent licenses include an option granting access to complete manufacturing know-how; and the period of royalty payments on any single product is limited to five years.[1]

The advantage to a country of having one negotiating body such as GOPCA in Egypt while working within the patent system is precisely to be able to limit license payments to a reasonable level. In most countries in Latin America, numerous manufacturers megotiate separately for patent licenses and this invariably forces payments to a higher level. One country which, like Egypt, has benefitted from having a central negotiating body is Colombia. Vaitsos[2] reports that the Colombian Committee of Royalties participated in the negotiations of 191 companies in the private sector from the middle of 1967 to the end of 1969. This resulted in a reduction of the total payment of royalties amounting to U.S. $4,560,900 for 1968 alone.

It must also be mentioned that the power of the negotiating body in Egypt is sufficiently wide to permit it to use its own discretion in assessing different situations. It has therefore been very flexible at times, allowing the extension of the period for which royalties are payable to twenty years, while in other circumstances it has ignored

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1. See Chapter III for details.

2. Vaitsos, C. V. Transfer of Resources and Preservation of Monopoly Rents, Op.cit., p.46.

patent rights and purchased raw materials from unlicensed sources. The bargaining power of GOPCA and its well informed judgment have together ensured local pharmaceutical companies the continued co-operation of foreign international firms at very reasonable cost.

It has been claimed, particularly by Vaitsos,[1] that observance of patents has led to considerable 'overpricing' of pharmaceutical products on the part of patent holders. The suggestion that patents alone have led to excessive prices is not substnatiated by his evidence. As Professor Penrose has pointed out, "..., for one can think of a number of considerations other than patents which could produce similar results, especially in the pharmaceutical industry, such as brand-name protection, transfer pricing to subsidiaries which would continue regardless of patents, subsidised or loss-making exports which would not be available on a continuing basis, etc."[2] In fact, many of the products listed by Vaitsos are protected only by brand names, and have competing lower priced equivalents from among the pharmaceutical companies operating in those same countries that observe patents.[3] The evidence offered by Vaitsos is therefore more useful as an argument for the abolishment of brand names, an argument referred to earlier in the text.

The working group set up by UNIDO agreed in its summary recommendations that "a developing country should institute, if not already in force, conditions whereby protection for patent holders will be provided as regards transfers to domestic producers and their foreign assoc-

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1. Vaitsos, C.V., Patents Revisited: Their Function in Developing Countries, Journal of Development Studies (Oct., 1972) Vol.9, No.1.

2. Penrose, Edith T., International Patenting and the Less-Developed Countries, Op.cit., p.777.

3. Vaitsos, C.V., Transfer of Resources and Preservation of Monopoly Rents, Op.cit., Appendix 2, pp.A-10. to A-14.

iates of patented technologies, materials and the like."[1] This is perhaps a recognition of the fact that as long as the patent system is tolerated in the industrialised world, a developing country cannot benefit from its own legislation designed to weaken protection, if such legislation is carried out unilaterally. It also reflects the prevailing attitude of the United Nations[2] which considers a strong patent system a necessary condition for the transfer of foreign technology to developing countries. The United Nations position has been criticised by Professor Penrose: "..., if the international patent bureau, and other international organisations, especially the more conservative among them such as those representing primarily business interests, would give explicit recognition to the special needs of the developing countries and accept that special restrictions imposed by them may be sanctioned internationally, adverse reactions from the multinational firms and others among the chief channels of technology transfer would be minimised."[3]

The UNIDO study on the pharmaceutical industry gives the impression in some places that the views expressed are strongly biased towards those 'primarily business interests' quoted above. An argument against the possibility of excessively high profits in the pharmaceutical market is thus made by the Secretariat of UNIDO,[4] in agreement with those contentions usually advanced by proponents of the multinational pharmaceutical firms.

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1. UNIDO, Establishment of Pharmaceutical Industries in Developing Countries, Op.cit., (ID/WG.37/3), p.16.

2. United Nations, The Role of Patents in the Transfer of Technology to Developing Countries (New York) 1964. Doc. E/3861/Rev.1.

3. Penrose, Edith T., International Patenting and the Less-Developed Countries, Op.cit., pp.784-785.

4. UNIDO, Secretariat, The Pharmaceutical Industries in the Second Development Decade, Op.cit., (ID/WG.37/2).

The Secretariat claim that quality competition - by which presumably they mean the existence of closely comparable products - is an important factor in holding down prices. "It (quality competition) increases the choice open to doctors and ensures that the varieties demanded by consumers will be manufactured. It is often hard to judge which of two or more different products is the best...; but, basically, quality competition fulfils the same function as price competition. Whenever the price is too high for a drug - or, in other words, if the quality of the product is too low for its price - manufacturers must bring their bids into line with the competition and make their goods more attractive. For this reason quality competition and price competition bring about behaviour that results in the suppression of excessively high profits. The position of an enterprise on a market with unvarying prices but with freely variable quality, seems to be similar to the position achieved on a market with constant quality but with mobile prices."[1]

This argument infers that the producer of a close substitute would willingly introduce his product at a price below that of the original drug, resisting the temptation to maintain that high level with the use of expensive promotional aids easily permitted by the high profit margins. But clearly, if the new variant were sold with sufficient sophistication as a scientific improvement on the original drug, there would be no need to bring down its price.

An aspect of the developed markets that developing countries have no clear need for is the high rate of innovation in the range of products being sold. This rate is even excessive for developed countries where health care has reached a finer stage of development in the

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1. Ibid., p.14.

field of, for instance, psychosomatic disease. The principal need in developing countries is for far more fundamental drugs to treat the more pressing diseases.

The cost of discovering, developing and promoting the continuous stream of new drugs, when spread over a company's products, then affects the cost of the older drugs that developing countries most need. There is a tendency, also, to introduce these new drugs, in place of the old drugs, in developing markets, with expensive consumer advertising, combined with a steady withdrawal of the original, and still appropriate, drug. All these costs, in developing countries, are largely unnecessary.

An interesting study by WHO[1] on comparative treatment costs for tuberculosis, using four effective drugs, illustrates how the drug of choice should differ between developed and developing country:

Drug	Standard adult daily dose	Cost per year (U.S. $)
Isoniazid	300 mg	0.90
Thiacetazone	150 mg	1.00
Para-aminosalicyclic acid	10 g	9.25
Streptomycin	1 g	17.25

"Under North American or European living conditions, the choice of drugs..., would depend, predominantly, on their antibiotic and toxic properties and on the prevalence of drug-resistant strains of pathogenic organisms in the area. Considering both benefit and risk, the anti-tubercular drugs of choice in these areas are isoniazid, para-aminosalicyclic acid and streptomycin.

In developing countries of low economic potential..., the minimal amount of money which must be spent for a single patient in order

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1. H. Friebel, Therapeutic Needs and Production of Drugs, (ID/WG.37/6) paper presented for the Expert Working Group Meeting, Op.cit., Budapest, 5 to 9 May, 1969.

to perform effective treatment becomes the critical figure which determines the choice of drug, since the drug which provides the least costly treatment per person permits the treatment of the greatest number of patients.

It is quite obvious that, from the above figures, because of their low price, isoniazid and thiacetazone would be the drugs of choice in a developing country, and that the predominant prescription of them would be advisable."[1]

This last example presented by WHO shows that within a small group of standard generic drugs for the treatment of the most infectious diseases, developing countries cannot afford to ignore prices. This suggests that it is even easier for these countries to reduce the conventionally high number of preparations for the treatment of other less vital diseases requiring such drugs as antibiotics, hormones, tranquilisers, sedatives, psychotonics and barbiturates. It is in these groups of drugs that product differentiation and promotional competition are most prevalent, leading to the wasteful use of resources and high prices.

Governments concerned with the unnecessary proliferation of variant compounds resulting from imperfect competition in the drug market can take steps to discourage the abuse of the patent system and trade marks by introducing more stringent regulations on the registration of new drugs and by enforcing appropriate restrictions on the promotion of drugs to physician and public. Furthermore, governments can decide to abolish the use of brand names as a major step towards reducing the monopoly advantage of patent holders after the expiry of their patent rights, and towards placing the sales and marketing of drugs on a more scientific basis.

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1. UNIDO, Expert Working Group, Op.cit., (ID/WG.37/3), pp.33-34.

In addition to the above considerations, developing countries must realise that certain drugs which have been passed by registration authorities in their country of origin as therapeutically safe and efficacious, may in developing countries turn out to be toxic or incompatible with the change in conditions. This "can occur under conditions of malnutrition or even different nutritional habits, of different types or incidence of drug resistance, of genetic disorders or average body size and weight, or different climate or other environmental factors that affect the absorption, metabolism and excretion of drugs."[1] According to UNIDO, co-operation can be sought from the World Health Organisation to assist developing countries in the training of the necessary personnel and in the establishment and maintainance of lists of "drugs of choice."

A number of developing countries have considered it useful to have a domestic production facility for pharmaceutical goods. Although the reasoning behind such plans has varied (prestige, the conservation of foreign currency, strategic considerations) and although investment in this industry has taken various forms (in terms of the level of integration and the extent of foreign participation), it seems fair to say that these decisions have at the very least been successful in placing the countries in a better bargaining position on the international market by giving them some degree of control over the supply of pharmaceuticals.

Planning the development of a national pharmaceutical industry is commonly part of a more general programme for industrialisation. The category of drugs as basic non-durable consumer goods places it within that group of products requiring relatively small capital investments and enjoying a ready and fast growing market. As shown

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1. UNIDO, Expert Working Group, Op.cit., (ID/WG.37/3), p.22.

in Table 10, the consumption of pharmaceuticals in Egypt increased ninefold in 18 years, whereas the consumption of other basic consumer goods approximately only doubled.

The stage at which a developing country enters into the pharmaceutical industry is an important decision that has perhaps up to now not been fully realised. The Secretariat of UNIDO pointed out in their report[1] that the primary production of pharmaceutical chemicals would not be advisable to a developing country because of the high cost of importing the many constituent raw materials and the know-how needed for such basic manufacture. Starting materials for the production of pharmaceutical chemicals are the output of an advanced fine chemicals industry which does not exist in developing countries. The technology and skills needed for operating plants producing pharmaceutical chemicals are again similar to those used in well developed chemical industries.

The report fails to reveal however the small part that basic pharmaceutical chemicals play in the total cost of finished drugs. This is a result of the lower degree of competition in the later stages of manufacture, a feature we have earlier noted when describing the economic relationships between the different producers comprising the international pharmaceutical industry. This crucial factor has been confirmed by the director of the production department of the Egyptian General Organisation for Pharmaceuticals and Medical Appliances (GOPCA), who described how raw materials used in the production of finished drugs accounted for a mere 16% of the value of final output at retail prices. In retrospect, it now seems obvious to Egypt that entering the industry at a primary production level was an unnecessary step in view of the negligible foreign currency saving this re-

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1. UNIDO, Secretariat, Op.cit., (ID/WG.37/2), p.11.

sulted in, and judging by the competitive world prices in comparison to which the cost of domestically produced raw materials is higher.

After fixing the most appropriate stage at which to enter the pharmaceutical industry, according to the size of a country's market and the stage of development of auxilliary industries, the next most critical factor is the decision of what form of protection, if any, should be given to the domestic industry. Too great a degree of state protection, especially in the form of high duties on imported drugs, creates unduly high profits for domestic firms which are encouraged to breed and multiply with the resulting waste of resources and excess capacity.

Other measures can be taken to encourage domestic producers. The most useful of these, given the character of the international pharmaceutical industry, are state financed research and quality control centres that can serve the needs of local firms on a collective basis, and collective advertising which can greatly assist the promotion of domestic products in the first years of the national industry's life. The state can also provide the domestic industry with the most reasonable terms for the purchase of foreign technology by adopting a common attitude to all foreign suppliers and taking an active part in any negotiations.

The relative merits of various forms of foreign investment in the domestic industry of a developing country deserves special attention. This subject, together with other problems encountered in the development of a pharmaceutical industry are clearly illustrated in the experience of Egypt. In a survey of different groups of developing countries according to their stage of development in the production of pharmaceuticals, Egypt is included in the most advanced group comprised of seven countries (Argentina, Brazil, China, India, Mexico, Spain and Egypt), which have become self-sufficient to some extent in the production

of pharmaceuticals.[1]

Egypt is an example of interest in that it is probably (with the exception of China) the country least dominated by the operation of international companies in its domestic market. This is because Egypt has allowed the entry of foreign capital and know-how both from the West and Eastern Bloc to build its domestic pharmaceutical industry, because it engages in trade with countries of both sides for its supply of raw materials, and above all, because the operation of the multinationals in Egypt has been under strict control from the specialised government agency, GOPCA.

The percentage of total domestic output of pharmaceuticals accounted for by foreign firms in Egypt was 17% in 1966 and 16% in 1970. The percentage share of foreign firms in the total market for pharmaceuticals (that is, including imported drugs) was under 30% for Egypt in 1970. This last figure contrasts with the following reported market shares of foreign firms in some other developing countries in the late sixties[2]: Brazil 78%, Argentina 65%, Peru 95%, Venezuela 90%, the Philippines and Central America over 80%. The figure for India in 1969-70 is reported to be somewhere between 65% and 75%.

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1. UNIDO, Secretariat, Op.cit. (ID/WG.37/2), p.23. According to this study, concentration of production within the group of developing countries is again evident. Six developing countries account for about 70% of the output of pharmaceuticals of the entire developing world (composed of 113 countries), nine countries account for approximately 80% of total production.

2. Wortzel, L.H., Technology Transfer in the Pharmaceutical Industry, UNITAR, Research Report No.14, New York, 1971.

Chapter II

THE EVOLUTION OF THE EGYPTIAN PHARMACEUTICAL INDUSTRY

This chapter traces the growth of the pharmaceutical industry in Egypt from its early origin in a private enterprise environment and through the decade 1952-62 which started with the Egyptian revolution and ended with the nationalisation of the domestic firms in the pharmaceutical industry. This decade witnessed the development of state intervention and control, a particularly slow and gradual process in the pharmaceutical sector, involving a two-way relationship of action and reaction between a centralised policy-making agency on the one hand, and the industry on the other.

1. Private Enterprise and Free Trade

The manufacture of pharmaceuticals in Egypt started on a very small scale in 1933 with the operation of a number of laboratories engaged in the production of a very few standard pharmacopeal preparations like zinc drops and protargol, or in the packaging of imported household medications like castor oil, sodium bicarbonate and glycerin.[1]

In 1937 Bank Misr founded the first large pharmaceutical firm with a capital of £E.100,000. This company, "Misr", met with great difficulty in the first years of its existence, unable to market its own brands of the same drugs distributed by the large international pharmaceutical firms under their brand names. It was not until World War II that "Misr" began to make positive profits, the shortage in imported drugs making way for the acceptance of Misr preparations. But profit margins were small, the company having to depend on imports of all the necessary raw materials, both for the manufacture and the packaging of its products. Growth of Misr sales was very slow, the

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1. The Central Agency for Public Mobilisation and Statistics. The Pharmaceutical Industry (319-10, December 1967) Cairo, p.11.

range of products successfully marketed being limited and subject to severe competition from the well established international brands. By 1956, twenty years after its creation, the company's total capital employed[1] amounted to £E.167,000, a mere increase of 67% over the period, gross profits[2] as percent of capital employed standing at 7%. These results contrast with a figure of 35% profitability only ten years later in 1967, capital employed having increased to £E.2,337,000.

In 1939, a second large pharmaceutical company, "Memphis", was set up with a capital of £E.40,000. The founder being an Egyptian pharmacologist, the company was to specialise in the extraction of active substances from some medicinal plants growing in Egypt, namely Ammidin and Khellin. The production of preparations based on these substances relied on the original research work of the founder and his company was able to market its products both at home and abroad. But outside its field of specialisation, "Memphis" did not venture to diversify into any of the several pharmaceutical groups that its plant capacity and know-how might have enabled it to, until some measure of protection was given to the domestic industry in the late fifties. Thus, we find that by 1959, after twenty years of operation, capital employed amounted to £E.300,000 and net[3] profits stood at 24% of capital employed. Ten years later, in 1969, capital employed had risen to £E.3,355,000 with gross profits standing at 39% of capital employed. Whereas the production and profitability of Memphis were based solely on its output of natural medicinal substances until the late fifties, the company's progress in the following period is largely attributable to diversification into other drug groups.

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1. Capital employed is defined as the sum of its long term liabilities (paid up capital, reserves, provisions and long term loans) and is therefore gross of depreciation.
2. Gross profit is defined as total profits before payment of interest, depreciation or taxes but net of administration expenses.
3. Net of taxes, interest and depreciation.

In 1947, a third large pharmaceutical company was established, "Chemical Industries Development" or "CID". This was the most ambitious venture into the pharmaceutical field by domestic private enterprise. The company was set up by an Egyptian capitalist who convinced a large number of physicians to buy shares. Expenditure on fixed assets exceeded the original capital paid, £E.100,000. New shares were floated and the participation of the "Industrial Bank" was sought twice.

By 1952, paid up capital of "CID" amounted to £E.250,000 and the company was still facing enormous difficulties in its finance and management. The total value of sales was very small in proportion to capacity and 73% of these sales consisted of the packaging of imported finished drugs. In the following years, the performance of "CID" was not improving as can be seen from the results of its operation in the period 1952-56.

Table 11. Annual Results for "CID", 1952-56

Year	Paid Capital £E.	Value of Own Production (market prices)		Net Accounting Losses £E.
		£E.	% to total Sales	
1952	250,000	17,055	27%	24,005
1953	250,000	15,555	70%	41,077
1954	250,000	30,182	86%	32,619
1955	285,000	37,658	73%	54,666
1956	285,000	125,477	80%	7,646

Source: Annual reports of "CID". Figures are book values from the balance sheet of the firm.

An enquiry into the firm's operation was demanded in 1955 by the shareholders, the largest being the "Industrial Bank" with a 34% holding, and the government appointed a member of the Committee for Health Services as its representative on the Board of Directors of CID in November 1955. This was the first instance of government

direct involvement in the operation of the domestic pharmaceutical industry. Its early timing, a chance event, was to give the government Committee (later to become the General Organisation for Pharmaceuticals, Chemicals and Medical Appliances" GOPCA) first-hand experience and insight into the structure of the market for drugs and drug manufacture. The new member on the Board of Directors of CID[1] (soon to become its Chairman) was to bring renewed support for and confidence in the viability of the company. CID was thus able to maintain its liquidity with a new injection of capital obtained from the Industrial Bank and a complete reassessment of the firm's production and marketing policies was made.

The most important change to affect CID's progress was to come in the following year, 1956. As with all other Egyptian firms, the range of products CID was restricted to manufacturing or packaging consisted of the older non-patented drugs, whether ethical or household. This limitation was partly due to lack of some of the necessary technical know-how, but the main reason was the difficulty of entering the market for new drugs, which was dominated by the international giants. The market for all modern drugs treating serious diseases (tetracyclines, chloramphenicol, hormones, tranquilisers and cardiac drugs) was totally restricted with insuperable barriers in the form of legal patent rights and marketing and distribution advantages held by foreign international firms. Drug imports thus accounted in 1955 for 89% of consumption in Egypt. In 1956, CID decided to seek the co-operation of a Belgian firm, Union Chimique Belge, to reorganise the production and distribution of its preparations; the agreement included

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1. The newly appointed member was Dr. Abdou M. Sallam, who was eventually elected as the Chairman to the General Organisation for Pharmaceuticals, Chemicals and Medical Appliances, GOPCA.

the production by CID of many of the Belgian firm's specialities[1] which were soon to account for the major share of CID sales. The following figures show how CID's production and profit position improved after 1956.

Table 12. Annual Results for CID, 1956-68

Year	Paid Capital £E.	Value of Production at market prices £E.	Net Profit £E.
1956	285,000	125,477	- 7,646
1957	364,980	254,407	+57,723
1958	513,000	455,526	+48,557
1968*	4,008,000	4,147,855	1,136,144

* Figures for 1968 are gross capital employed, value of production and gross profits.

For the first time, a domestic firm was to become the licensee to a famous international pharmaceutical company, which although not among the group with the highest exports to Egypt (the majority of exports into Egypt came from Britain, Switzerland and France), could offer CID all the technical and managerial skills that it lacked. The royalty payments on this all-inclusive type of license agreement is probably the highest ever incurred by any Egyptian pharmaceutical firm, being calculated on net sales of all CID products, whether licensed brands from the Belgian firm or not. But in return, CID received not only production know-how as in ordinary license agreements but also extensive co-operation at all managerial levels of the firm, especially with marketing and distribution. In 1966, when the agreement was terminated CID was left with a legacy of the highest ratio of advertising and distribution expenditure to sales among domestic firms.

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1. These specialities included penicillin and streptomycin derivatives, tranquilisers, cough syrups and antihistamine preparations. They were all marketed under their foreign brand name.

With the exception of the three domestic firms discussed above, the size of manufacturing establishments (which numbered sixty-five in 1952) was very small, the entire pharmaceutical sector employing 1,100 persons and producing an output worth half a million pounds at market price. Thus, in spite of a comparatively early start, the Egyptian pharmaceutical industry was, after twenty years of existence, still struggling to maintain a 10% share of the growing home market. According to a study carried out in 1954, excess capacity in the industry was 37%.[1] Unused machinery and installations were mainly in the larger companies which were doing very poorly as compared to the smaller establishments. The kind of drugs produced in the whole of the industry until 1956 come under only ten of the forty-five possible therapeutic groups. The market was flooded with a proliferation of domestic brands of household drugs such as analgesics, cough and cold preparations, laxatives, antacids, vitamins (coming under four therapeutic classes). Of the ethical drugs treating serious diseases, very few preparations were manufactured by the larger firms, that is the ones adequately staffed with skilled personnel and housing sophisticated quality control units. Until 1952, no antibiotics were produced in Egypt, and for many years after this date, domestic firms were relying on the import of penicillin, streptomycin, and various types of sulpha drugs in their bulk finished form, together with all the necessary packaging materials to perform the imple packaging operation for these drugs in their laboratories. Newer types of antibiotics like tetracyclines or chloramphenicol were produced in Egypt only after 1959. A study of the list of 150 raw materials constituting the requirements of the five major pharmaceutical firms for their production in 1957

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1. The Pioneers, Committee of Physicians, The Problem of Drugs.

shows that not a single substance required is less than ten years old, and that the majority of these are in fact much older medicinal compounds whose official names can be found in the pharmacopeas of the early thirties.[1]

The Egyptian consumer market thus depended for its supply of all newly discovered drugs on imports from some 500 foreign pharmaceutical firms, with 88 agents engaged in the import and distribution of more than 20,000 foreign drugs accounting for 90% of the total market in 1952. Until the late fifties, the whole-saling and distribution of foreign drugs was carried out by the same agents who were engaged in their import, giving them considerable power over the entire market. Although actual figures for the level of concentration in the market for imported drugs are not available for this period, it has been widely reported[2] that only a handful of Egyptian agents controlled the import of the majority of foreign drugs, the source of which was concentrated among the group of Swiss, British, German and French Pharmaceutical giants. The importing companies owned a network of 180 storage depots throughout the country, employing 2,500 salaried employees and workers to advertise and distribute their drugs (when it must be remembered that total employment in the domestic industry equalled 1,100). Given the importance of marketing expenditure and marketing skills in determining the relative success of particular brand names in the pharmaceutical market, foreign drugs promoted by and sold through the distribution channels of the major pharmaceutical agents (agents that is, to the international giant firms) held many

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1. The list is appended to a letter addressed to the Ministry of Supply and is written by the head of the Committee for the Development of the Pharmaceutical Industry, 30 Jan. 1957.

2. Dr. A. M. Sallam, The Production of Pharmaceuticals in Egypt, 35th Annual Congress of the Egyptian Institute of Scientific Studies, 6-11 March 1965.

advantages over equivalent brands marketed by other less famous foreign companies or the domestic producers. With their superior experience in distribution at the retail end of the market, and with their sophisticated advertising techniques directed at the prescribing physician, those international companies could not be dislodged from their dominant position. Whenever a local brand of any promise was to appear on the market, and before it had the opportunity to achieve any significant sales, large quantities of its foreign equivalent would flood the market, chemists being offered free supplies at no cost until sold. Such credit facilities, special discounts, free goods and bonuses are just some of the several tools which were used by the established sellers in manipulating the market.[1]

It can therefore be said that although the larger domestic pharmaceutical firms had both the production capacity and the necessary know-how to imitate a large proportion of the newer and most profitable drugs introduced into the market by the international giants - as will be shown they successfully did this soon after this period - these Egyptian firms could not surmount the entry barriers created by the sheer magnitude of advertising budgets supported by the foreign firms, true giants when compared to the size of any of their local competitors.[2] That advertising and marketing were the crucial factors inhibiting the success or growth of domestic firm's sales is clearly demonstrated by the changing fortunes of CID once it had decided to adopt a new advertising and marketing strategy comparable to that of the large foreign manufacturer, with heavy promotional expenditure directed mainly at the physician (a large sales force of detail men, organised meetings and conferences for doctors, a monthly medical

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1. Dr. A. M. Sallam, Ibid., p.4.

2. In The Pioneers, Op.cit., page 8, it is asserted that the Egyptian doctor relied almost completely on the advertising of foreign firms for information on modern therapies.

journal distributed free, etc.).

Turning now to the role of the small pharmaceutical laboratories operating in Egypt in the 1950s, these confined their production to the very last stages of processing drugs into the simpler dosage forms, the typical firm investing in the purchase of a tablet making machine and some vessels for the admixture of solutions, relying on the crudest quality control procedures and the barest standards of hygiene. Although the products of these laboratories were limited to household remedies such as tonics, cough syrups and aspirin, so that their existence was no serious threat to the health of the poorer sections of the population consuming their cheaper products (cost of producing was obviously lower for these firms employing the minimum of machinery and personnel), the larger domestic firms were suffering from and complaining of the additional competition which the multitude (about 65) of tiny laboratories presented to them. Domestic medium-sized and large establishments were thus unable to make any serious headway into the market for ethical modern drugs by the marketing and distribution advantages of the international firms, and found the most lucrative portion of the household drugs market encroached upon by the low cost laboratories concentrating on the production of only those preparations and dosage forms offering the highest markups. When the Committee for Health Services was asked to make a study of the domestic pharmaceutical industry, it recommended the shutting down of the majority of existing laboratories, but this step was only taken much later, after the nationalisation of the domestic sector in 1962.

The main reasons why the existence of the very small pharmaceutical laboratories was thought detrimental to the rest of the industry seem to have been the following:

a) Quality standard: As mentioned in Chapter I section 2, the final processing of drugs into their dosage forms must undergo several tests for ensuring the purity, uniformity and stability of the active ingredient, even if the source of the active ingredient is a reliable foreign manufacturer. Small laboratories did not have their own facilities or the resources to employ outside services to perform such essential quality control operations. The hazards involved in allowing them to sell their products which could only be assayed by the Department of Health on the occasional routine checks that this department carries out, meant that these small laboratories should either be encouraged to expand their activities sufficiently to enable them to afford quality control procedures or else force them to shut down.

The low quality of packaging materials used by small laboratories was also an important factor responsible for the patient's lack of confidence in the therapeutic value of the drug. This translated itself into a general distrust for any local product.

b) Research capacity: Although the importance of research is only secondary in the production of simple household drugs, the presence of qualified pharmacologists and chemists on the premises enables the firm to keep in touch with developments and improvements in the processing of drugs. The manufacture of pharmaceuticals involves the continuous introduction of new ingredients and techniques to improve the absorption of basic pharmaceutical chemicals into the system and diminish their side effects.

The most common outcome of low standards of expertise in processing tablets for instance is the choice of inappropriate binders (to mix with the active ingredient) or the selection of unsuitable pressures in stamping out tablets. This results in tablets which,

although conforming to required standards of purity, will nevertheless fail to be absorbed satisfactorily in the body.

Research facilities would also enable the firm to have a minimum rate of innovation in its range and quality of products. The pharmaceutical industry must be seen as a dynamic sector, scientifically oriented towards change since its development depends upon the continuous introduction of improvements to existing therapies. Small laboratories lacking in research facilities remain static, producing and selling drugs in the same way as producers of confectionary. Even the know-how involved in imitating modern drugs is itself dependent on the availability of advanced research techniques.

In view of the above considerations, the Committee for Health Services judged that on balance, the arguments against allowing small laboratories to continue operating outweighed any economic benefits derived from their competitive prices. Whereas the policy needed to cut down the number of domestic firms and their products on the market could be easily formulated, the task of reducing the number of foreign drugs in Egypt was far more complex. The import of drugs was of a very profitable nature. Several of the agents dealing with the major pharmaceutical giants are reported to have made large fortunes from their operation in a highly restricted sellers market.[1] The pricing of foreign drugs was supposedly fixed by the Ministry of Supply which allowed a margin of 65% on the formal invoice FOB price of these drugs, to be shared by impoters, wholesalers and retailers. But these FOB prices were decided upon by the importers themselves according to their judgment of market conditions, and blank invoices were often received from foreign manufacturers for his agent to fill in Egypt.[2]

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1. Minutes of meeting of "Higher Organisation for Pharmaceuticals, 20 September 1960.

2. Ibid.

In 1952, within two months of the revolution, it was announced by presidential decree[1] that the markup on the import price of drugs was to be reduced from 65% to 46%, thus reducing the price of drugs to consumers by approximately 15%. To evade a reduction in their profit margins, the importers retaliated by gradually raising the FOB price of drugs to the benefit of their bank accounts abroad.[2] The Ministry of Supply was unable to deal with the situation since it had hitherto accepted the price stated on an invoice and added the agreed markup on it to arrive at the final retail price. It was clear to the authorities that the only way to deal with such a situation was to have some kind of knowledge of the level of prices in countries of origin or in the international market, but with a market as wide and complex as that for pharmaceuticals, the task was almost impossible at the time. The number of foreign pharmaceutical firms registered as exporters of drugs to Egypt was over 500, of diverse origin and selling about 20,000 products of varying importance in terms of medical or commercial value. When the Committee for Health Services was set up in 1955 to study and advise on the pharmaceutical market, it started by collecting information on all imported drugs according to origin and manufacturers.

The complete lack of any statistics on drug consumption made the work of the Committee very slow and difficult. Retail outlets kept no continuous record of their sales, and distribution depots could not be relied upon to give accurate information because they all belonged to importers. Furthermore, ministerial control over drug imports was dispersed among several independent government departments. The Ministry for Supply was responsible for pricing, the Health Ministry was

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1. Decree No.177 for 1952.

2. Ibid.

responsible for registration, and the Department of Commerce was regulating the distribution of the imported drugs. The Committee therefore had to rely on the customs to tabulate all the data it required.[1]

The main effort of the Committee was to group pharmaceutical imports into their therapeutic classes according to their generic names, with information on their source, the name of the manufacturer, the brand name, and the price of each drug. Two important recommendations were made. First it was suggested that the proliferation of equivalent drugs be curtailed by withdrawing import permits from all foreign manufacturers of unknown reputation on the international market (it was alleged that many foreign laboratories of low quality standard had entered the Egyptian market because of the lack of restrictions from the Health Ministry, in spite of the fact that these same laboratories were not allowed to sell in their country of origin).[2] The second recommendation was that a single government body should undertake the responsibility for drug imports so as to achieve some measure of control over prices which were found to be greatly divergent according to source and overtime. These recommendations were carried through at a later date, the first resulting in the elimination of 465 foreign firms from the import register,[3] and the second in the complete nationalisation of the import and distribution functions by the state in 1960, thereby removing the monopolistic advantages of the international companies which were held through their control over the marketing and distribution channels for drugs in Egypt.

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1. The statistics were collected for the Committee by officers of the "Central Agency for Public Mobilisation and Statistics" at the customs offices. This work which was supposed to take 6 months to complete in fact took one year and a half.
2. Lecture 3 in the Economics of Medical Care, Dr. Abdou M. Sallam, Minister of Health, Ain Shams University, 1968, p.4.
3. Ibid., p.4.

The introduction of government control over the sale of foreign drugs was to offer the domestic industry in Egypt a significant improvement in its competitive position.

2. Developments in the Institutional Framework, 1952-61

Interest in the state of medical care and the pharmaceutical industry in Egypt was shown soon after the revolution by the Council for Production and Services, a new government body created in 1953 to promote the growth of national income and of social services. The division of the Council concerned with domestic production was responsible for introducing the first measure of protection to the domestic pharmaceutical industry in the form of a 10% preference on the prices it came forward with in any government tenders. The division in charge of the growth of social services initiated the first projects for the mass control of tuberculosis and for the setting up of rural health units.

In 1955, those two branches of the Council for Production and Services examining pharmaceutical production and health projects were merged into a separate Committee for Health Services. This Committee was independent of the Ministry for Health and its duties were to study and advise the government on ways by which the supply of drugs could be directed to satisfy the real needs of the population. A thorough study of the domestic consumption of drugs was undertaken for the first time in Egypt in conjunction with a survey of the incidence of disease. One of the principal objectives of the study was to arrive at a plan for the encouragement and development of the domestic pharmaceutical industry.

As mentioned on page 72 , the committee started by grouping all drugs on the Egyptian market according to their generic names. Although this analysis was to throw much light on the source of drug imports

and the international drug market, the main concern of the Committee was to draw from the figures information on those drugs widely consumed by the public which could be produced economically in Egypt. The five groups of pharmaceutical raw materials most commonly used in the preparations on the market were found to be salycilates, penicillin, sulpha compounds, streptomycin and chloramphenicol. Both the quantities and value of these substances formed a large percentage of total consumption of pharmaceuticals, they were all imported from abroad either as finished drugs or as active ingredients ready for packaging (the special conditions relating to each product are described in full in Chapter IV, Section 4), and the medical importance of all five groups was deemed sufficient to suggest that it was in Egypt's interest to establish primary production facilities for their manufacture.

In 1956, the first Ministry for Industry was created in Egypt. Among its first decisions, it set up a new Committee for the Development of the Pharmaceutical Industry,[1] to make final recommendations on the work prepared earlier (by the Committee for Health Services) for projects in the establishments of domestic plants producing pharmaceutical raw materials. Membership of this new Committee was partly made up of members of the previous bodies, plus an engineer and a chemist (former members were two doctors and a pharmacologist). The committee was to receive all necessary cooperation in preparing its report from the Ministry of Industry and it was requested to present its report before September 1956.

This last Committee was unable to complete its task in time, and referred in its report to all the complex problems besetting the domestic pharmaceutical industry which could not be solved by controls

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1. See Ministerial Decree number 5, issued on 29 July 1956 by the Minister for Industry.

on imports alone, on prices alone, or by encouraging domestic production alone. It called for the creation of a single government body to deal rationally with all aspects of the market for pharmaceuticals, one central agency with control over imports production, distribution and pricing of drugs.

In 1957, after the Suez war and with the ensuing economic blockade on Egypt, many vital drugs were in short supply and the need for greater self sufficiency in domestic production was strongly felt. By presidential decree a Higher Organisation for Drugs and Medical Requisites was set up as a permanent body.[1] The organisation was headed by the Minister of Health and included in its membership representatives from the Ministries of Trade, Industry, Supply and Finance, as well as the Presidents of the Association of Physicians and the Association of Pharmacists.

The role of the Higher Organisation was defined as the supervision and guidance of all matters pertaining to the domestic production and general supply of pharmaceuticals in the country.

A separate executive committee was set up under the Ministry for Industry to implement any decisions taken by the Higher Organisation for Drugs and Medical Requisites after their ratification by the President. The power and responsibilities of the Higher Organisation were now much more comprehensive than those assigned to any previous government committee concerned with the pharmaceutical market, which was soon to undergo many important changes.

GOPCA was to make plans for the provision of all the country's needs for drugs and medical requisites, to examine the import of pharmaceuticals with special attention to prices and quality, to harmonise the work of the government departments responsible for the import

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1. Presidential Decree number 19 for 1957, issued on 7 January 1957.

production and distribution of pharmaceuticals, to supervise the growth of domestic firms, and, finally, to administer the manufacture of pharmaceutical raw materials.

One of the first significant achievements of the Higher Organisation was the publication of a guide to doctors and pharmacists, providing them with information on all available domestic and foreign medical preparations. The Index for Medical Specialities was prepared by some university professors of pharmacology and attempted for the first time to classify all drugs according to their therapeutic group, giving under every group heading a complete list of known therapies by their generic composition (whether a single substance or a combination) with a sublist of all available brands for each generic composition.

In the first section of the book, the products were classified into drug groups according to their pharmacodynamic action. There were 44 drug groups, many further subdivided into subgroups (e.g. Group "Cardiac and Vascularetics" was subdivided into Cardiac Glycosides, Cardiac Depressants, Antihypertensives, Hypertensives, Xanthines, Vasodilators, Sclerosing Agents etc...). Products are described in the form of a monograph to provide the following information:drug group, form, scientific code, approved name, mode of action or indication. Detail is further given on commercial name, pack, manufacturer, available sizes and strengths. Even though a particular brand name may be absent from the market, it is usually listed, especially if well known, so that the physician can take note of available substitutes.

Section 2 of the book gave an alphabetical index by trade names. These brands are listed alphabetically with the manufacturers name

following. The number following the brand name refers to the page in Section I where the product is described.

Section 3 gave an alphabetical index by approved generic names. The numbers following the approved name referred to the pages in Section I where the product was described.

Section 4 gave an alphabetical index by manufacturer names, each followed by the list of specialities (brand names) of the firm.

The early publication of the Index of Medical Specialities was particularly useful to the domestic industry as a form of free publicity for its little known products. New editions of this book are now published every three or four years and distributed free to doctors and pharmacists.

The independent role and authority of the authors makes the index they prepare a competent source of information on new domestic products of equivalent generic composition to international brands which are normally widely advertised.

In 1957 the Higher Organisation began to plan for future expansion by examining three groups of projects in particular.

1. The first set of projects was designed to accelerate the growth of existing firms by supplying them with capital and arranging license agreements between them and large foreign concerns for the manufacture of specific groups of drugs of medical and commercial importance to the Egyptian market. The Higher Organisation was instrumental in seeking the cooperation of foreign pharmaceutical establishments, in negotiating the form of the individual license agreements and in insuring the good faith of the Egyptian Government in fulfilling all the licensee's obligations towards the foreign licensor.

Examples of the earlier projects which were implemented are:

a) Expansion of "Misr" company

Building a new unit for the processing and packaging of chloramphenicol and various penicillin and streptomycin derivatives. Technical assistance obtained from a Dutch firm, "Delft" to instal new machinery and equipment at an approximate cost of £E.55,000. License agreement to produce and sell these drugs under Delft trade marks at royalty cost of 5% of exfactory sales value. Production started in 1959.

b) Expansion of "Ama" company

New unit for the processing and packaging of insulin prednisone, testosterone and liver extract from their raw materials. Installation of machinery at capital cost of £E.140,000. Technical assistance from an Italian firm "Vister", royalty payments at 5% of sales for 10 years to be reduced to 3% for following 5 years, then stopped. "Vister" to participate in 20% of capital investment and annual value of production was estimated at £E.120,000.

In the next ten year period, the trend for the employment of foreign know-how in domestic production was accelerated, and local firms were encouraged to take the initiative in contacting large international firms and negotiating license agreements, subject to the general conditions laid out by the Higher Organisation.[1]

2. The second set of projects involved the setting up of a number of plants for the manufacture of basic raw materials (active ingredients) used in secondary manufacturing by the existing domestic pharmaceutical firms. The preliminary studies on these projects had been started in 1955 by the Committee for Health Services who made an assessment of the therapeutic needs of the country, and based on it the selection of items for basic production.

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1. See Chapter III.

As mentioned earlier, the primary production of pharmaceutical raw materials on the horizontal level is typically non-complementary (antibiotics require fermentation processes, synthetic compounds require chemical processes...), so that projects were evaluated on an individual basis. Foreign assistance was sought from the different specialised manufacturers in the West, and by 1957, various European companies had submitted their schemes for the construction of raw material pharmaceutical plants. Each firm would supervise the construction of a particular factory, the purchase of equipment and the training of Egyptian staff in all economic and technical matters.

Although several competitive proposals were advanced by foreign firms, none of these was backed by the necessary finance from abroad. Capital requirements for such heavy industrial investments are typically high, running in the million pound region. The Ministry for Industry which was to implement any investment plan, was unable to finance these costly undertakings, having already contributed substantial amounts of foreign currency in the purchase of machinery and equipment for expanding the production capacity of the domestic firms (in the first set of projects discussed above).

Shortly after the Suez war, Russia offered the Egyptian government substantial loans for investment in projects of Egypt's choice (the largest loan contracted was for the construction of the High Dam, amounting to £E.113 million). The idea of one grand investment, a huge pharmaceutical chemicals complex covering five different production processes, found favour both on political and economic grounds. Politically, the size of the project acquired a special meaning to the public, which christened the complex "The Medicine City". Economically, it was thought that economies of scale would be gained in two directions:

First, a single research and quality control unit would need to be built to serve the separate plants. This meant lower costs per unit of output, both in terms of research and quality control equipment and in terms of qualified personnel.

Second, the extension of public utilities to serve the entire complex would again cut down the cost per unit of output of such costly services as the supply of water and electricity, road works and effluent disposal systems.

Concensus was reached on the site and size of the entire project and the agreement between Egypt and Russia for the setting up of "El Nasr Company for the Production of Pharmaceutical Chemicals" was signed in January 1958. Section 4 of Chapter IV reviews the establishment and operation of this enterprise.

3. The third set of projects studied by the Higher Organisation was the setting up of subsidiaries of large international pharmaceutical firms in Egypt. Bargaining on the terms of the agreements took place between the foreign companies and the Ministry for Industry.[1] The main subjects of argument were concerned with the ownership of the subsidiaries and the extent of control by the government. Some members of the Higher Organisation were dissatisfied with the joint venture nature of the arrangement whereby the foreign parent company would own 60% of the capital investment and Egyptian private shareholders the remaining 40%.[2]

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1. Details of the terms of the agreements and the operation of foreign subsidiaries in Egypt can be found in Chapter III.

2. After nationalisation of the public sector of the pharmaceutical industry, GOPCA tried to acquire some of the shares held by Egyptian nationals whose property was sequestrated so as to derive a measure of control over the subsidiaries.

But the power of the Higher Organisation was still limited to the extent that the various ministries concerned could make their own decisions independently. In 1958 and 1959 three foreign concerns were thus awarded contracts by the Ministry for Industry to build and operate subsidiaries in Egypt.

Another notable instance where the policies of the Higher Organisation were thwarted by the ability and insistence of another ministry to demonstrate its independence occured in 1959. The pricing of domestic drugs had not been subject to government control, and the Ministry of Industry now took it upon itself to review the prices charged by all domestic firms without consulting the Higher Organisation,[1] and without taking into consideration the fact that the system of control on foreign drug prices (by another ministry) was totally ineffective.[2]

The Ministry for Industry collected figures on unit cost of production for most domestic drugs and allowed oncost percentages arbitrarily decided for other expenditures (free samples, administration, advertising) and profit to arrive at what were considered reasonable prices. These new prices were enforced in March 1959, with the result that some of the domestic firms found that they were making negligible profits. With the ensuing stream of complaints from the industry and the Higher Organisation, a reappraisal of the system of pricing was made and some prices were readjusted upwards.

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1. According to the memorandum presented by CID on 30th March 1959, both the Higher Organisation and the Executive Committee for Industrialisation had made an earlier study of domestic prices and concluded that pricing should be left to the discretion of the firms themselves. See Chapter IV.

2. See page above. The importance of foreign drug prices on the pricing policy of domestic products is discussed in Chapter IV Section 2.

Despite this kind of opposition, the Higher Organisation was still able to develop an increasingly important position as the formulator of a national policy for the control of the pharmaceutical market.

In 1957, domestic production had risen to £E.1.7 million,[1] but local firms were still finding it difficult to capture more than 20% of the total market for pharmaceuticals. One of the greatest obstacles to achieving a reasonable level of sales of domestically produced drugs was the proportionately smaller profit margin earned by the retailer. The more expensive foreign products naturally produced greater profits. To counteract this, the Higher Organisation decided to allow a profit margin of 19% to the chemist on domestic brands as opposed to 10% on foreign brands.

An earlier attempt to protect the domestic industry had been the offer of 10% price preference to Egyptian manufacturers in competitive bids for government orders. But most of these orders for hospitals, rural health units, and the armed forces, were for drugs not made in Egypt, and only available on the international market.

The next move to protect the home market was a halt to the import of any drug formulation which was domestically produced by at least three manufacturers. To encourage the sale of the range of products selected, manufacturers agreed to reduce their price levels. The reduction in prices was to be compensated by the rise in demand so that total revenue would not be affected. Examples of drugs reduced in price by CID in 1958 are penicillin, streptomycin, some antacids and laxatives.

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1. Egyptian Federation of Industries Yearbook 1957-58, Cairo, p.152.

Two years later, in February 1960, an important step was taken to establish a greater degree of autonomy for the Higher Organisation.[1] Previously dependent on central government for the remuneration of its members and the finance of its operations, it was now granted the status of a corporation, with responsibility for its own finance.[2] However, all the members of the original Higher Organisation were elected directors of the new organisation, thus ensuring continuity of purpose.

A few months after this, foreign manufacturers were asked to bid for future supplies of government orders through the Higher Organisation.[3] The Higher Organisation collected the separate orders of the government departments, with the drugs grouped under their generic names, and added the orders from the public sector for the same drugs .

The next step was to take over all systems of import and distribution but, before doing that, the Higher Organisation borrowed £E. 3 million from the Treasury and ordered all essential drugs to arrive in Egypt by a stated date, which was actually the date set for the take-over. The plan here was to ensure a proper stock by the time the take-over was announced, and thus to avoid a sudden fall in supply.

Despite these safety precautions, though, foreign suppliers sensed the intention behind the move and immediately created a campaign against it in the news media. Newspapers carried warnings of the supposed dangerous effects of the concentration of supply through one body and of the obvious effect of a great many of the existing brands of medicines quickly disappearing from the market.

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1. Presidential Decree No.291 for the reorganisation of the Higher Organisation for Drugs and Medical Requisites.
2. The newly established board of directors was empowered to fix charges for any services rendered by the Higher Organisation, to accept donations, and to borrow, in order to supplement the allocations voted to it from the national budget.
3. Presidential Decree No.292, 1st February 1960.

This campaign led to panic buying, which meant that the initial stocks built up to guard against the effects of a change in the system were more quickly depleted. For instance, supplies expected to last six months, in fact lasted only for three.

Then, by Presidential Decree,[1] it was announced on July 14, 1960, to coincide with the opening of the sealed bids, that the state would immediately take over all importing agencies, all distribution agencies, and all inventories. The Higher Organisation was given the sole responsibility for the import of all drugs, pharmaceutical chemicals and medical appliances.

Compensation for agency owners was fixed at a 6% profit margin over the agreed inventory prices. The prices themselves were agreed upon by a compensation committee, which included owner representatives, as well as representatives from the Ministry of Supply, and was headed by a legal member of the Council of State.

The Presidential Decree made it clear that all agency employees were to stay employed for the time being, automatically becoming employees of the Higher Organisation.

The Decree laid down that the advertising bureaux attached to the agencies could only resume their trade with permission, given in the form of a licence from the Ministry of Supply.

Finally, a public corporation was established to run the marketing agencies, and distribute all drugs whether domestic or imported, while the Higher Organisation was left to control import supplies.

The new corporation was called The General Organisation for Trade and Distribution of Drugs and was given a far greater financial autonomy

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1. Presidential Decree for enactment of law No.212 for 1960, concerning the Organisation of the Trade in Pharmaceuticals, Chemicals and Medical Appliances.

than was possible for the Higher Organisation alone, because it would generate its own income from the commercial operations it was assigned to perform.

Eventually, despite the earlier panic buying, it was clear that the Higher Organisation had achieved its aim of reducing the FOB prices of many imported drugs. The public soon gained the benefit of this when the Ministry of Supply announced the reduction in price of all foreign drugs by 25%.[1]

It was soon found, however, that the Higher Organisation and the General Organisation were overlapping, to a degree,in their functions, so it was agreed to set up a consultative body to achieve a degree of liaison. Directors of each organisation were appointed to sit on this body to ensure maximum cooperation.

There were three major problems as yet to be solved, which called for immediate attention.

The first was how to use the advertising bureaux inherited from the former agencies. So in December 1960, the Higher Organisation decided to allow them to stay in business, but employing what was then to be called 'Scientific Officers.' The head of each office would have to be a suitably qualified pharmacologist, but the remaining staff would have to be, as far as possible, the same staff as before. Foreign companies were allowed to operate individual or joint scientific offices, on the condition that all expenses of the office would be financed from abroad (this condition was later relaxed in all instances where the foreign company is a licensor to local companies).

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1. Ministry of Supply Decree No.167, 25 August 1960. Reduction of retail prices of all imported drugs and infant milk by 25% of last price fixed by Ministry. Profit margin to chemist to remain fixed at 16% of CIF price (equal in practice to 10% of retail price). These new prices rule to this day.

Advertising by all bureaux, though, would have to be restricted to ethical journals only, and thus considerably reduce advertising budgets below previous levels, while other publicity and information techniques would be allowed in the form of direct contacts with doctors and the distribution of free samples. These samples would themselves be rigorously controlled and recorded, with the Higher Organisation controlling their importation, including the receipt of a quota of each free sample import.

The second most immediate problem was to work out the most effective method of ensuring continued employment of the staff of the former independent agencies in the face of an apparent excess of 1,800 staff above the new requirements. This obviously called for long-term solutions, with the maximum amount of cooperation between the new organisations, each supplying staff as posts became vacant in other organisations, but still, all the same, paying wages.

The third main question requiring an answer was the proper position, in the new national structure, of the retail chemist.

It was decided that the retail chemist would continue to play his previous part independently, receiving the same trade discounts allowed to him before take-over.

As mentioned earlier, the role of the chemist in Egypt is not limited to that of dispensing drugs according to prescriptions. His knowledge and experience are continuously called upon to give advice to consumers on the choice of drugs to treat all kinds of ailments from eczema to dysentry.

GOPCA was therefore careful in ensuring the continued profitability of running pharmacies. The following account describes the regulations (which govern to this day) and the income which was

generated by the average pharmacy in Egypt in 1962/63.[1] The total number of pharmacies was 1200, owned and run by registered pharmacologists.

-- Imported drugs 10% profit margin allowed on retail price.
Imported milks 7% profit margin allowed on retail price.
Total value of sales of imported drugs in 1962/63 £E. 10 million.

-- Domestic drugs - 19% profit margin allowed on retail price.
Subsidiaries drugs - 15% profit margin allowed on retail price.
Total value of sales of domestic drugs in 1962/63 £E. 6.8 million.
Additional 1% discount allowed for cash payments.

-- Medicaments prepared by the pharmacist - 40% profit allowed on retail price. The average value of sales of this group to total sales was 2-5%.

-- Cosmetics - 20% profit allowed on retail price. Average sales 2-5% of total sales.

Gross profits[2] of the 1200 pharmacies for the year 1962/63 equalled £E. 432,200 before allowance for the remuneration of pharmacologists (owners). This yields a very low income if compared to the income of 1200 similarly qualified pharmacologists employed by the government who can earn between them an annual £E. 1,272,000 plus paid holidays, pensions and lower tax payments (income taxes being lower than commercial taxes).

It would therefore seem from these figures that although GOPCA did not reduce standard profit margins allowed to pharmacies when it took over the function of import and distribution from private importing agencies, the income of the retail chemist was, nevertheless, substantially lowered in comparison to pre-takeover levels. This is confirmed

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1. Dr. Abd Allah Badry, Study of the Economics of Pharmacies, paper presented to the Second Conference on Pharmaceuticals, the Association of Pharmacists, Dar El Hekma, 12 July 1964.

2. Gross profits defined as total revenue from sales minus total costs of running the pharmacy (rent, services and wages of assistants).

from conversations with the owners of some pharmacies in Cairo who explained that previous to the nationalisation of distribution, private agents and wholesalers supplemented the standard profit margins allowed to chemists with important benefits in the form of additional discounts, free goods and special bonuses. The situation, as described, is very similar to that which still exists in the distribution of drugs in unregulated markets like the U.S.[1] Representatives of pharmaceutical firms would have an even greater incentive to encourage the Egyptian pharmacist to promote their products, since he is known to have considerable influence on the consumer's choice of brand or even drug type.

The profits made by private pharmacies in Egypt have probably increased since 1963 because of the great increase in their turnover (total drug sales through chemist outlets in 1969/70 were £E. 31 million at retail prices). The increase in the sale of domestically produced drugs as a percentage of total sale of drugs in Egypt (this percentage moved from 53% in 1962/63 to 86.3% in 1968/69) has also meant an increase in the earnings of pharmacies since they receive larger profit margins on domestic as opposed to imported drugs.

3. Nationalisation of the Industry 1961-63

The nationalisation of all imports of pharmaceuticals, finished drugs as well as raw materials, was the first dramatic step in the reorganisation of the domestic market for pharmaceuticals. But this was only part of the Higher Organisation's plan for playing an active role in the affairs of the pharmaceutical sector. It was now to press the government to give it direct control of the domestic industry so as to execute its plans for development with greater efficiency.

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1. See Christopher A. Rodowskas, Jr. "Competition in the Pharmaceutical Industry" in Pharmaceutical Marketing, Op.cit., p.144.

By 1961, Egypt's plans for industrialisation were well under way, and the government decided to introduce state control in all major industries. With this objective in mind, several General Organisations were created to administer the industries, on behalf of the respective ministries. For example, The General Organisation for Spinning and Weaving was established under the Ministry of Industry, while The General Organisation for Pharmaceuticals, Chemicals and Medical Appliances, GOPCA, was similarly created under the Ministry of Health.

But because centralised control of the pharmaceutical sector was already well advanced, the structure and responsibilities of GOPCA were to a large extent formulated by the members of the Higher Organisation for Drugs who had already experienced the evolution of the industry and contributed so much to its progress.

On July 20, 1961, the state declared its decision to take a controlling interest - in the form of at least 50% of capital - in the ten largest pharmaceutical firms. This coincided with similar moves in other industries.[1]

The value of each company's capital was defined according to the price of its shares on the Cairo stock market on the last day before the announcement of state control. For those companies whose shares were not deal with on the stock exchange, capital was valued by a Committee headed by a judge from the Court of Appeal. The decision of the Committee, which was to study any case for a maximum of two months, was irrevocable.

In the pharmaceutical industry, the ten largest firms to be partly nationalised included CID, Misr and Memphis which were to maintain their identity and management; another six firms were merged into two

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1. Presidential Enactment of Law 118 for 1961 for Government Participation in Some Companies and Establishments.

large companies, Kahira and Ein Shams (later to be enlarged and renamed Nile); and the tenth was to form the nucleus for the establishment of the Alexandria company.

The General Organisation for Pharmaceuticals, Chemicals and Medical Appliances, GOPCA, was created by Presidential Decree in January 1962. Its structure and responsibilities (which rule to this day) were defined as follows:[1]

GOPCA must take over all the duties of the Higher Organisation for Drugs and of the General Organisation for Trade and Distribution of Drugs. Moreover, GOPCA must take steps to rationalise domestic production by merging small establishments, encouraging specialisation, reducing wastage. It must allocate a proportion of its expenditure to research in the industry, devise a pricing policy in the light of studies made on costs and profit margins, and it must establish a plan for exporting surplus production to suitable markets aborad.

Decisions of the Board of Directors are taken by majority vote, the Chairman passes decisions to the Minister of Health for ratification. The Board of Directors is to determine wages and salaries of all GOPCA employees, select GOPCA representatives to sit on Boards of Directors of nationalised companies, arrange long-term loans, accept donations, fix charges for any services it renders. Administrative expenditure in importing should not exceed 2% and in distribution 5% of value of sales.

Sources of finance for GOPCA operations are allocations voted from the national budget, profits on the state's share in the capital of the nationalised companies, earned income from GOPCA activities, and borrowing.

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1. Although GOPCA was created along with other General Organisations in 1961, its duties were finally defined in 1962 when it actually began to operate (by Presidential Decree No.994 for 1962).

The Directors of GOPCA were again elected from among the group of doctors, pharmacologists and chemists who were members of the previous series of government committees.

The first five year plan (1960-65) for the development of the pharmaceutical industry was already under way.[1] Large allocations for investment were available from the Treasury and GOPCA hastened to draw up its programme for the reorganisation of the sector now under its control. Four specialised departments were set up to deal with planning, imports, production and distribution.

The major objectives of GOPCA were disclosed in a memorandum issued by its Board of Directors one month after its creation. The salient features of the programme were the following:-

1. Planning

The research team was to construct complete and detailed indices for consumption of drugs over time so as to forecast future demand in the various therapeutic categories. The forecast was to take into account the spectrum of disease of the population and the expected growth in public expenditure on health. It was then used to assess the requirements of the different sectors consuming drugs, private and public.

The existing capacity of the domestic industry was supplying 20% of the consumption in 1960 and it was planned that this capacity should be better utilised and expanded so as to satisfy 65% of total estimated consumption by 1965.

A thorough study of all foreign sources of prospective imports was to be made with special emphasis on quality, prices and payment terms (hard currency being more scarce than trade agreement funds).

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1. The first five year plan for industrialisation (of which the pharmaceutical sector was a major target) had started in 1957, but was now supplanted by a new five year plan for 1960-65.

A classification of therapeutic groups was to be made according to priorities for imports so that in case of currency shortage, those groups more vitally needed (antibiotics, cardiac, diabetic drugs) would be purchased in preference to the less urgent drugs.

The planning department was also responsible for establishing a new pricing policy for foreign and local drugs for the different consuming sectors according to the "principles of socialism".

2. Production

To ensure a proper foundation for the growth of domestic production it was necessary to evolve a system of effective quality control in manufacturing establishments. This was one of the first tasks that GOPCA pursued with great thoroughness. Quality control departments were expanded in all GOPCA firms and the latest scientific equipment was imported.

The penalty for not reaching a sufficiently high standard of production was the withdrawal of a laboratory's license. This did in fact happen a year after this rule was introduced to approximately 50 firms. Many of these were firms which had been noted for their low quality standards by the Higher Organisation before the rule became effective.

A Scientific Research and Control Centre was established in 1963 to ensure that quality standards were maintained. Another important side of the Centre's responsibilities was to analyse the potential of foreign drugs specifically for the Egyptian market.

A further critical part of the Department's work was to evolve systems for accelerating production techniques and in particular reducing wastage. One of the most severe causes of loss was seen in the breakage of ampoules during filling. A loss of up to 45% of ampoules in some of the firms studied in 1962-63 was reduced to 25%.

The five year plan for the pharmaceutical industry stipulated an increase in production of 30% a year, a target which was in fact exceeded.

Another essential phase in the industry's evolution was the swift amalgamation of a great many nationalised companies. The plan was to establish new laboratories with more obvious potential for increasingly expensive investments.

The new amalgamations were generally based on completely new sites of sufficient size to allow for plant expansion. Existing machinery and equipment were moved from old laboratories to the new installations.

3. Import and Export

An export department was set up, not so much to increase sales aborad, as to dispose of surplus production. This was because it was thought impossible to consistently compete with the established foreign companies on the international market.

4. Distribution

Distribution was also rationalised by offering incentives to retail chemists to set up shops in more distant rural areas, complemented by other pharmacies set up by GOPCA.

A critical list was also drawn up of essential stock that all chemists must keep, at risk of losing their license. Many of these drugs were often not kept due to insufficient profit margins.

Public participation in the pharmaceutical industry continued in 1963[1] by the state extending its controlling interest in the nine principal firms to a direct and total control, together with an additional nine but smaller laboratories, followed by cancelling the licenses of the remaining 46 firms.

In 1964,[2] four companies producing auxilliary materials used in

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1. Presidential Decree No.65, 13 June 1963.

2. Presidential Decree No.50, 1 March 1964.

the manufacture of pharmaceuticals were nationalised and placed under GOPCA's control. Two of these were absorbed into existing pharmaceutical firms and the other two (producing aluminium tubes and plastic containers) were merged to form The Pharmaceutical Packaging Company.

Two commercial companies were set up by GOPCA to undertake the distribution of pharmaceuticals:

The Egyptian Company for Drug Trade distributes finished drugs through 40 branches to 1,428 retail pharmacies.

Al-Goumhouria Company supplies laboratory chemicals and other raw materials to manufacturing and research establishments. It also provides the health sector with its requirements of medical and scientific apparatus and mechanical equipment. It also equips and furnishes hospitals and health units belonging to the Ministry of Health. Besides it runs 23 pharmacies of its own.

With this complete control of import, manufacturing (the only exception being the three foreign subsidiaries) and distribution, GOPCA had achieved its objective for the reorganisation of the structure of the Egyptian pharmaceutical sector. The number of manufacturing establishments was finally reduced to seven firms engaged in the processing and packaging of drugs, while one large primary chemicals plant, El Nasr, was to start operating in 1964.

4. Present Structure

The final structure of the Egyptian pharmaceutical industry was established in 1964, after all processes of reorganisation by GOPCA had been accomplished.

In terms of ownership, the industry is divided into two sectors. The small private sector consists of three subsidiaries to foreign international firms, operating as joint ventures between their parent companies and private Egyptian shareholders. Control of the administration is with the foreign partner who owns 60% of share capital.

Apart from these three subsidiaries, all other firms in the industry belong to the public sector. There are seven manufacturing firms comparable to the subsidiaries in terms of the manufacturing stages performed, and one primary producing company for pharmaceutical chemicals.

The following Table gives a brief description of the total of eleven domestic pharmaceutical manufacturers.

Table 13. Private and Public Sector Pharmaceutical Companies

Name of Company	1st Year Production	Capital Employed 1967/68	Labour 1968	Sales 1967/68	Sales 1970/71
Private Sector					
Pfizer-Misr	1962	1.200	257	1.2	1.4
Hoechst-Orient	1962	.624	247	1.3	2.4
Swiss-Pharma*	1965	.313	220	0.9	3.0
Public Sector					
Nile	1963	5.828	2,367	4.7	6.2
CID	1950	4.008	1,619	4.2	6.1
Kahira	1963	3.141	1,071	2.7	4.2
Memphis	1940	2.729	795	2.1	2.9
Misr	1937	2.337	1,414	2.6	3.6
Arab	1964	1.857	504	1.5	2.3
Alexandria	1963	1.521	435	1.4	2.6
Nasr	1964	8.000	1,666	1.1	3.6

Source: Balance sheets of all firms. All figures for sales and capital employed in £E. million.

* Swiss Pharma is the subsidiary to a consortium of three Swiss international firms, Ciba, Wander and Sandoz.

To understand the administrative structure of the firms, we shall look at the rules governing the setting up of two of the public joint stock companies, Kahira and Arab company, by the process of merging a series of small firms after nationalisation.

The share capital of the new companies consisted of the total net worth of the individual companies amalgamated, that is, book value of total assets less current liabilities and fixed liabilities. This share capital was transferred to GOPCA and compensation paid as follows: where the original company was already a joint stock company the value of the shares was to be repaid to shareholders according to their market value on the stock exchange at the day of clcsure before nationalisation. Where the original company was a private concern, owners were to be paid the value of the net worth. The new joint stock company formed was given legal existence for a period of fifty years renewable by government decree.

Administration of the new companies is the responsibility of a Board of Directors, composed of at least three and at most seven members. Two members represent the workers and the salaried employees, elected by secret ballot by each group. One to five members are appointed by Presidential Decree, one at least being among the Managing Directors of the Company, appointed on the recommendation of the Chairman of the Board. Appointment is for three years, renewable.

The Board of Directoes is to meet at least every four months and the decisions are taken by majority vote.

Net annual profits of the company are distributed as follows:

5% of net profits are appropriated to statutory reserves equal to fifty percent of capital.

5% of net profits is appropriated to the purchase of government bonds.

5% of share capital is distributed among shareholders and 'workers and employees' in the ratio 3:1 as a first dividend payment.

10% of the residual is the maximum payment to the Board of Directors. The Board then chooses whether to distribute the new residual among

shareholders and 'workers and employees' as a second dividend payment (again in the ration 3:1) or to allocate it for future growth.

Taxes are presently at the rate of 35% of profits before distribution.

Although the firms are autonomous agencies, GOPCA has effective control as the majority shareholder. In its capacity as major shareholder (only a small proportion of shares are owned by the Industrial Bank and the Treasury), GOPCA has the right to elect the chairman of the Board and to approve the increase or decrease of the firms' authorised capital. GOPCA's duty is to guide and harmonize the operation of all the firms under its control, by approving of their annual plans for production and investment, which are prepared by their Boards of Directors. This approval is normally given without much alteration, because there is a high degree of consultation and coordination between the planning departments of GOPCA and the firms.

In Chapter IV, the behaviour and performance of the domestic firms are discussed in relation to the new structure described above.

Chapter III

FOREIGN INVESTMENT IN THE EGYPTIAN PHARMACEUTICAL INDUSTRY

1. Introduction

The pattern of supply of pharmaceuticals to world markets has gradually been changing in response to changes in the type of competition between the pharmaceutical firms, and also because of changes in tariff levels and non-tariff barriers such as drug registration procedures, import quotas and foreign exchange restrictions.

Many developing countries are gradually instituting regulations and trade restrictions designed to favour the domestic production of drugs. The various measures taken have either encouraged or forced the international companies to increase their local operations within many of the individual markets being supplied.

An opposite trend is expected to take place in the European Economic Community with the harmonisation of drug regulations and the lifting of tariff barriers between national markets, factors which should boost interregional trade at the expense of local manufacture. Most international companies which have set up over the past two decades individual production facilities in every important European country, a trend we shall discuss below, are now likely to centralise their production operations for greater economy.[1] The entry of Britain to the Common Market is also likely to reduce its importance as a base for supplying pharmaceuticals to Commonwealth countries because of the change in the tariff structure.

In general, before the 1950s, most international drug manufacturers concentrated the bulk of their production activities in their

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1. Peter S. Mould, "The Pharmaceutical Industry and the Balance of Payments", in The Pharmaceutical Industry and Society, ed. George Teeling - Smith, Office of Health Economics, London, 1972.

country of origin. All stages of manufacture of drugs were located at the source of research and development in the five major innovating countries, Germany, Switzerland, Britain, France and the U.S.A. Each national group of companies was confined by political and market forces to supplying its traditional foreign customers with exports of finished drugs in relatively limited and stable competitive conditions.

In most countries of Africa and Asia, drug sales were dominated by the European companies of the nation which was the present or former colonial power. Outside the British Commonwealth and the former French territories, the old established German and Swiss companies dominated the market.[1]

In Europe itself, with the exception of Britain, each country is to this day dominated by its national companies:[2] the largest firms in Germany being Boehringer, Hoechst, Bayer and Schering. In Switzerland the dominant firms are Hoffman - La Roche, Ciba, Geigy, Sandoz and in France Rhone-Poulenc Specia and Uclaf Roussel.

The American drug industry was relatively small until the second world war when it began to operate on a wide scale in Latin America, Canada, Britain and the Philippines.[3]

Competititon on the international pharmaceutical market was thus limited in terms of traditional geographical areas served by companies of the five different nationalities and in terms of the degree of product competition which had not reached the peak level of the 1950s. "Prior to World War II a fraternal attitude of live and let live served as a 'modus operandi' for the industry. If one firm developed an effi-

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1. Richard C. Fenton, "Worldwide Ethical Drug Markets", in Pharmaceutical Marketing, ed. Op.cit., p.305.

2. Walter Guzzardi, JR., "The Untranquilised Drug Makers", in Pharmaceutical Marketing, ed., Op.cit., p.297.

3. Richard C. Fenton, Op.cit., p.305.

cacious product within a certain field, the other firms were apt to avoid that field in their plans for research and product development. In the decade since the end of the war, this attitude has changed to one of intense competition".[1] Another writer expresses the view that: "Before the technological upheaval, competition was really only a decorous kind of tug-of-war,... At one time the Swiss companies arrived at a 'gentleman's agreement' under the unwritten terms of which no Swiss company would push into a product line that was meat and drink - and good wine too - for a Swiss brother. No one had to poach - there was plenty to go round for everyone.

But that amicable condition no longer obtains. The main engineers of the change have been the invading American companies, which arrived in force after World War II."[2]

The multinational activity of American companies was to expand very rapidly in the 1950s, together with the world demand for newly discovered antibiotics and psychotropic medicines in whose research and development these firms had played an important role. Direct exports from the U.S. "in the immediate post-war years were dampened by the world dollar shortage".[3] There was therefore a great incentive for the American firms to operate outside the U.S.

American firms chose Europe as a base for overseas expansion. Demand for drugs in Europe was expected to grow faster than in any other area. In the late fifties, this market was growing at the rate of twelve percent a year, and in 1963 the size of Europe's drug market

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1. Joseph D. McEvilla, "Price Determination Theory in the Pharmaceutical Industry" in Pharmaceutical Marketing, ed., Op.cit. pp.146-147.

2. Walter Guzzardi, JR., "The Untranquilized Drug Makers", in Pharmaceutical Marketing, Op.cit., p.299.

3. Reaching World Markets, A report on international marketing in the pharmaceuticals industry. Prepared by the Centre for the Study of Industrial Innovation on behalf of the Pharmaceuticals Working Party of the Economic Development Committee for the Chemical Industry, Nov. 1971, London (NEDO Publication).

was still only 70% of its U.S. counterpart, while the population of Europe was 60% larger than the American population.[1]

"In those years the U.K. became a favoured location for the multinational growth of foreign-owned firms. It had special attractions. It was politically and economically stable. For the American firms, it was English speaking and it was encouraging to inward investment compared with other potential European locations. The establishment of the NHS in 1948 coincided with these factors to provide a unified market which was expected to offer companies a potentially profitable environment.

The additional advantage which the U.K. could offer, and which was mentioned by most companies, was its links with Commonwealth countries. In several cases foreign-owned subsidiaries were established with the special brief of developing sales in Commonwealth nations. This was not simply a case of taking advantage of Commonwealth preferences..., many Commonwealth countries share social features which are historically British in origin. These include legal systems, British medical tradition and practices, and similar sets of poison regulations."[2]

The leading American firms in the international market are Pfizer, Merck Sharp and Dohme, Parke Davis, Lederle, Upjohn, Smith Kline and French, Lilly, Squibb, and Searle. In 1962, Pfizer is estimated to have made 46% of its total business in foreign markets, returning dollars to the U.S. at the rate of around $40 million every year. In Britain, Pfizer moved from practically nothing in 1953 to an estimated ethical drug business of $20 million in 1962. Pfizer's total sales in Europe in that year were about $50 million (out of an estimated total of $176 million of foreign sales), placing it among the top three companies with Roche and Rhone-Poulenc.[3]

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1. Walter Guzzardi, Op.cit., p.302.
2. Reaching World Markets, Op.cit., p.8.
3. Richard C. Fenton, "Worldwide Ethical Drug Markets", Op.cit., p.305. and Walter Guzzardi JR., "The Untranquilized Drug Makers", Op.cit. p.299.

But not all European markets were as easy to penetrate as the British, because of traditional doctor preference, especially in France and Germany, for the products of local companies.[1] Multi-national companies have therefore entered into licensing and other marketing agreements among themselves to facilitate their entry into many of these national markets. In France, for instance, Pfizer, Wyeth and Searle entered into such arrangements with the Clin-Byla group, while Parke Davis was selling through Roussel. In Germany Pfizer sales were handled from 1950-58 by Boehringer and in return Pfizer established in the U.K. a Boehringer division which was subsequently the basis of Boehringer's own British subsidiary. Lederle was in business for eight years with Chemie Grunenthal, and Squibb owned 25% of Heyden in Germany. Fisons has entered into a joint venture operation with the Belgian UCB to introduce a new Fisons ethical product in Germany and France, the British company providing technical and marketing expertise and UCB providing local management services. Fisons has also entered into a marketing agreement with a Swedish company which is providing distribution and representation in some Scandinavian markets.[2]

But cross licensing and other marketing agreements are only temporary stages in the gradual establishment of independent corporate existence by the multi-national firms. "Most companies stressed that in achieving their fundamental goals, the immediate task of developing overseas markets is usually the acquisition of direct marketing control by the company itself; that is, managerial control by the company over the direction, emphasis and timing of product launches, sales programmes and budgets, promotional campaigns and so on. This cannot be achieved

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1. Walter Guzzardi, JR., "The Untranquilized Drug Makers", Op.cit., p.300.

2. Examples taken from Walter Guzzardi, JR., Op.cit., p.300, and from Reaching World Markets, Op.cit., pp.15-16.

so effectively when exports are distributed by an agent as when the company handles its own distribution by establishing a marketing subsidiary."[1]

The trend towards setting up production or marketing facilities in every important country was accelerated in the 1960s, spurred by the growth in the number of firms competing for sales in each particular market, and by the high rate of innovation which meant a growing and fast changing range of products which each company tried to market as quickly and as efficiently as possible. Price competition continued to have little significance in the international market for drugs,[2] while product differentiation and marketing control have assumed growing importance. "Patented products almost certainly constitute the major element of pharmaceutical sales for any company, and generate the majority of growth. But the period of a patent sets a limit to profitable product life... Moreover it is common for pharmaceuticals to be superseded technically by competitive development prior to patent expiry and this may further reduce effective product life. Because the approach of patent expiry and the threat of competitive obsolescence are quite exogenous to the firm, a premium is put on speedy generation of maximum sales volume."[3]

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1. Reaching World Markets, Op.cit., p.9.

2. The increasing share of Eastern European exports in world trade in pharmaceuticals may however introduce a new era of price competition on relatively older but medically essential products (i.e. products embodying the major threrapeutic advances). According to the U.N. figures for Commodity Trade Statistics, six East European countries accounted together for 10% of world trade in pharmaceuticals in 1968.

3. Robert H. Jones, "The Modern Multinational Structure of the Pharmaceutical Industry", in The Pharmaceutical Industry and Society, Op.cit., pp.1-2.

The multinational activities of pharmaceutical firms differ in important respects from those of other industries operating internationally. The most striking peculiarity that emerges from a close study of international pharmaceutical firms is that conventional problems of location such as relative production costs are not of major significance in the decisions of companies to branch overseas, and the second peculiarity is the wide degree of flexibility in the form of representation that companies can achieve in any particular market. The study sponsored by NEDO found that "in general, within the pharmaceutical industry, neither transport nor direct production costs have a central effect on the location of production. Several companies in the sample emphasised that the activities of the pharmaceutical firm were oriented towards the development of new products and their marketing, with production being a subordinate function. As an extreme view, it was stated to be 'irrelevant'."[1]

As discussed earlier in Chapter I, economics of scale in production are only important in the basic stages of manufacturing active pharmaceutical ingredients. Multinational companies therefore find it economical to concentrate their primary production facilities in a limited number of locations where the availability of raw material chemicals and skilled labour as well as their cost becomes an important consideration.

But secondary stages of pharmaceutical production require small capital investments and relatively little technical expertise. Pharmaceutical processing, finishing and packaging can be carried out economically on a very small scale. This characteristic of the production process, together with the fact that transport costs for pharmaceuticals are low, means that products can be manufactured up to some early semi-final stage and then exported for further processing in their country

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1. Reaching World Markets, Op.cit., p.4.

of destination. This flexibility in production explains the possibility for a multinational firm to achieve great variations in the form of its representation in foreign markets.

The factors which influence a company's decision on the location and extent of its operation in any particular country are mainly external to the firm itself - market size, trade regulations, registration requirements and political conditions in the market. Some countries will not allow the importation of finished and packaged products, but will admit partly processed chemicals. Others give purchasing preference to products with a local element in their manufacture. The trend towards the encouragement of domestic production is particularly strong among developing countries and the result, as one American representative put it, is that "the tendency in our industry operating around the world is to decentralize and build small pharmaceutical plants in order to comply more easily with the local preferences and regulations... However, small pharmaceutical plants can be reasonably economical. So long as the pressure does not extend to the local manufacture of the basic substances, which would be very uneconomic, the trend is not too bad."[1]

The choice of methods of overseas marketing - exporting, licensing, or manufacturing through subsidiaries - are not mutually exclusive alternatives. Local manufacture even in the largest subsidiaries never completely replaces the export of finished drugs to that market, and considerable quantities of semi-finished raw materials are normally shipped from the parent firm for overseas processing.

The setting up of a local subsidiary is itself no indication of the extent to which local production is carried out in a particular market. Companies often register a new subsidiary with nominal capital for the sole function of marketing.[2]

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1. Richard C. Fenton, "Worldwide Ethical Drug Markets", in Pharmaceutical Marketing, ed., Op.cit., p.309.
2. Reaching World Markets, Op.cit., pp.16-17.

The typical multinational company is thus supplying its various overseas markets by a number of different investment operations. It will normally concentrate its primary producing chemical or fermentation plants in one to four locations around the world, with several more subsidiaries being supplied with bulk pharmaceuticals from these locations for further processing. In addition it will set up many small packaging plants in markets the size of which is too small for production to be economical. Some pharmaceutical markets are too small for investment even in marketing facilities. "For a country with a small pharmaceutical market, the effort and expense involved in establishing a marketing subsidiary may never be worthwhile, however attractive the market may be in other respects. Amongst the sample companies, by the time a firm has developed a turnover of £½-£1 million per annum in a given market, it will generally have begun to consider the establishment of a marketing subsidiary."[1]

2. The International Pharmaceutical Firm in Egypt

Until the 1950s, as described in Section 1, international pharmaceutical firms supplied the markets of developing countries with exports from a limited number of industrialised countries. In Egypt, all foreign drugs (which accounted for over 90% of the total value of sales in 1952) were exported to the market in their finished form. The absence of any trade restrictions on the direct export of finished drugs to developing markets made local production unattractive to international firms. Even where economies of scale are important as in the manufacture of penicillin and sulpha drugs, the opportunity to set up pharmaceutical subsidiaries in one of the largest markets in the less-developed world, India, was not taken up by ICI for instance, which already had other long standing interests in, and substantial trade with the Indian market. A representative of ICI explained that,

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1. Ibid., p.17.

as long as pharmaceutical products were on the priority list for imports and foreign currency appropriation in India, there was no need for ICI to establish manufacturing facilities there, and it was now felt that it was unfortunately too late to start building such facilities,[1] (presumably because many other companies who took the initiative before ICI in setting up subsidiaries were now in control of the major share of the market).[2]

In Egypt, when the government began to encourage the expansion of local production by the existing private pharmaceutical companies, by giving preference to the purchase of their products and offering them loans to purchase foreign equipment, many of these firms sought the cooperation of international firms in license agreements. But the famous and well established foreign companies were reluctant to enter into such arrangements,[3] the reason being that in the absence of trade barriers this method of operation is less profitable than direct exports. "Where alternatives are available, licensing to non-associated companies will generally not be used, primarily for reasons of loss of control but also because of lower earning potential."[4] It was only in 1956 that an important multinational firm, the Belgian UCB, agreed to enter into a licensing and management arrangement with Egypt's CID, on terms which were later felt to be too costly to the Egyptian party, and are in perspective the most favourable that any foreign company has received in Egypt.

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1. Interview with Mr. Percy Tinker at ICI House, Millbank, London, April 7th, 1971.

2. About 70% of the Indian pharmaceutical industry is already dominated by the production of multinationals.

3. The few license agreements which were negotiated before 1956 were with little known Swiss and Italian firms.

4. Reaching World Markets, Op.cit., p.14.

With the growth of trade restrictions in the developing world, the outlook and attitudes of international companies has radically changed. Restrictions of one type or another are continually being introduced in developing countries either as protective measures for local industry, or as means of conserving foreign exchange, or because of political considerations. Import quotas, foreign exchange restrictions, tariffs, all with a discernible degree of discrimination against the traditional trade structure in pharmaceuticals have been instituted by developing countries. In Egypt, the special government committee set up to supervise the growth of the domestic pharmaceutical industry was gradually taking over the control of all imports and distribution of pharmaceuticals while offering foreign firms the opportunity to take part in the internal development of the domestic sector on terms which they could negotiate with the committee itself, as described in Chapter II.

The only alternative to losing business in such circumstances has been for international firms to start producing inside the developing world. The setting up of subsidiaries or licensing arrangements in these countries can only be seen as a defensive policy on the part of the foreign investor. This was described in detail by the President of an American company, Merck Sharp and Dohme International: "Not realising the facts would have meant a loss of these markets. Basically our action was a defensive one... Let me add that one of the largest U.S. chemical-pharmaceutical firms did not take action and as a consequence their international position became very weak - their way back seems to be very difficult and costly."[1]

The basic factor which will affect the cost and profitability of any particular foreign firm's operation in this new situation is Timing.

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1. Dr. Antoine T. Knoppers, "The Choice between Exports and Overseas Operations", The Wharton School of Finance and Commerce, University of Pennsylvania, Philadelphia, 1954-63.

The governments of developing countries, by putting restrictions on the import of finished pharmaceuticals and inviting international firms to join the now protected market in actual production and/or licensing arrangements, are in fact inviting these firms to join an oligopoly club, far more concentrated in membership than the pre-restrictions situation. To be among the first is therefore essential since only a limited number of firms will be sufficient to satisfy total domestic consumption of a developing market as compared to the total number of potential suppliers from outside. The international firms which have been aware of the implications of a developing country's decision to put restrictions on imports and have accepted to take the risk in setting up operations inside those countries are now reaping the advantages of great opportunities in terms of substantial increases in sales as well as the benefits of a secure and stable market for which production programmes can be well planned in advance and safely executed.

By 1958 the Egyptian Higher Organisation for Drugs had drawn its final plans for increasing the domestic capacity of the pharmaceutical industry to become the major supplier of the country's needs for drugs. The purchase of technology from abroad formed an integral part of these plans, since local companies had limited experience in the manufacture of modern drugs requiring advanced skills and know-how. While the Higher Organisation was striving to encourage foreign firms to enter into license agreements with local producers, four offers were made by some of the largest international companies to set up subsidiaries in Egypt. These were Pfizer, Wyeth, Hoechst and a Swiss consortium of Ciba, Sandoz and Wander. Long negotiations took place over the extent of ownership, Egypt demanding as much control as would enable it to consider the investments as 'national'. Agreement was reached with three of the offers,[1] which gave the foreign companies 60% of share

1. The agreement with Wyeth failed to materialise, although the site for the plant was chosen and a capital loan from the American government was secured.

capital, and hence the effective control of the joint ventures (the remaining 40% of issued capital was sold as shares to the general public). For these international companies to accept the participation of Egyptian investors was a major concession, and to further agree on terms which limited the transfer of profits considerably meant a partial surrender to Egypt's growing strength in negotiation. Joint ventures are not widely utilised in the pharmaceutical industry because of the relatively low capital requirements. The non-capital advantages they confer can usually be obtained through a marketing agreement.[1] "In pharmaceuticals they (joint ventures) may be conceived, like other methods of market entry, as a stage on the way to the eventual full representation by the newcomer through a wholly-owned subsidiary. Only when this can be catered for in the agreement are joint ventures likely to occur."[2]

The manager of the Hoechst subsidiary operating in Egypt explained that although his firm had opportunities to set up plants in Argentina or Mexico, where it could obtain much more favourable terms as compared to Egypt at the time (1958), the choice of Egypt was based on the awareness that the opportunity might not be available for long.[3]

The uncertainty involved in starting manufacturing operations in developing countries as compared to developed ones, can be a very inhibiting factor to foreign companies. The instability of laws and regulations governing a new nation makes commercial calculations most difficult, and the ruling political climate can mean sudden or drastic changes of policy towards foreign interests.[4] International pharma-

1. Reaching World Markets, Op.cit., p.16.
2. Robert H. Jones, "The Modern Multinational Structure of the Pharmaceutical Industry", in The Pharmaceutical Industry and Society, ed., Op.cit., p.6.
3. Interview with Mr. Shetto, Director General of Hoechst-Orient, Al-Matarieh, Cairo, June 11, 1972.
4. An often quoted example is that of Evans, which was invited by the Burmese government to set up a joint venture only to be nationalised within four years of its starting to produce.

ceutical firms have hedged against such risks by making their capital outlay as small as possible at the start of their project. Swiss Pharma borrowed funds in Egypt equal to five times the value of its authorised capital by 1965, the first year of production. Hoechst-Orient designed the outlay of their plant to allow for future growth in the event of continuity of favourable conditions to their operations. It was now, in 1972, building a new plant adjacent to its older buildings and with a production capacity five times as large.

In this new situation, it is extremely difficult to compare the profitability to an international pharmaceutical firm of different types of operation in a developing market. The income generated from subsidiaries or license agreements depends much more on the terms which the international firm can obtain than on the form of ownership itself. The general policies and regulations of the developing country determine the conditions under which any form of operation can be conducted (e.g. price control, registration requirements, royalty payments and profit distribution) and therefore constitute the upper limit on the possible income flows the company can derive. Within this framework, one can describe the profitability of the two main types of activities in which multinational firms have engaged in Egypt, subsidiaries and license agreements. We have borrowed for this purpose the classification used by Constantine Vaitsos to analyse income flows derived by international firms operating in developing countries.[1] According to this classification the four sources of income are: royalties, commission fee for services and overhead allocations, intermediate goods overpricing, and interest and profit payments to parent.

a) Royalties

For manufacturing industry: "Generally royalties range from

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1. Constantine Vaitsos, Income Distribution, Welfare and Transnational Enterprise,

3% to 10%, but lower and higher percentages occur; for example, in the pharmaceutical field royalties on modern drugs are around 20% or more."[1]

In Egypt, an upper limit of 5% on royalties has been instituted since 1958. Although this seems very small in comparison to the royalties international pharmaceutical firms can obtain in other countries, the second and third types of income flows which are discussed below are a good compensation for the moderate royalty payments. Since the upper limit applies to license agreements as well as subsidiaries, neither form of investment has an advantage to the foreign firm in this respect.

It is important to note that in Egypt royalty payments are calculated on net sales (defined as sales minus all normal commercial discounts) and are not liable to any deductions for purposes of income or sales taxes.

Royalties of 5% are a very small return to international pharmaceutical firms when compared to a percentage of gross profits to sales of 20% in Britain, our country of reference, or an average markup on sales of 59.5% for that same country in 1965.[2]

Yet when the operation of the international pharmaceutical firms is viewed in the context of a defensive strategy to supply a marginal market, its decision is based on the balancing of all its incremental revenues and costs from such operations and any net revenues are better than none, providing proper allowance is made for all opportunity costs.

b) Commission fee for services and overhead allocations

Income flows of this type can be an important additional source of revenue to the parent firm under both licensing arrangements or the operation of subsidiaries.

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1. Peter Mainhardt, Inventions, Patents and Trade Names, A Gower Press Handbook, 1971.
2. Sainsbury Report, Op.cit., p.108, Table 16. Average markup is defined as sales minus manufacturing cost of sales.

In Egypt agreements have included the payment of commission fees for the purchase and installation of machinery (which often originates from the parent firm). But the more substantial, continuous and questionable payment which is included in most agreements between the Egyptian government or Egyptian firms and the international pharmaceutical firms is the allocation of a fixed percentage of the sales of licensed products towards the advertising expenses of the publicity office of the parent firm in Egypt, payable in local currency.

In the 1958-60 period, after studying and supplementing the negotiations over the first license agreements, the authorities at GOPCA prepared a model or standard agreement document to be consulted by both parties to all future agreements. This document, reproduced in full on p.147 , stipulates a maximum royalty payment of 5% in foreign currency. It is normally accompanied (i.e. in 90% of all cases) by a separate marketing agreement which stipulates the payment by licensee to licensor of 10% of net sales of agreement products as a contribution to the licensor's local 'scientific office', to be paid in Egyptian currency. It was gathered from discussions with GOPCA officials responsible for drawing these standard rules that the allowance of an additional 10% payment to the foreign firm was allowed as a kind of compensation for the low level of royalty payments, while limiting the transfer of foreign currency to the parent company to the 5% maximum.

As far as our analysis is concerned, however, the percentage contribution to advertising or scientific offices can be treated identically to the percentage royalty payment made to foreign firms, on account of two factors. In terms of the foreign currency outflows which the Egyptian government is so careful about checking, the international pharmaceutical firms have been saved the percentage of sales which they would otherwise have transferred from abroad to maintain their publicity offices in Egypt. Even where the advertising expenses might have been

less than the full 10% which is remitted to these offices, the fact that several pharmaceutical companies are allowed to run their advertising activities through a joint office in Egypt[1] means that those foreign companies with no revenues in local currency (because they only import directly from abroad) can make arrangements with those receiving the percentage contribution and repay them abroad.

The second factor which allows us to treat the licensee's participation in the advertising expenses of the foreign partner as a net flow of income to the foreign firm is that the payment of a full 10% of the sales value of licensed products is an enormous burden on the local company. The average percentage spent by Egyptian firms on their total advertising and sales budget is a modest 3.5% of the value of all their sales (see Table 15), where this figure includes all the overheads of running their own publicity offices.

c) Intermediate goods overpricing

One of the best methods for the multinational firm to retain large profit margins once it has decided to conduct subsidiary or licensing operations in a host country is to include in the agreement a restrictive clause allowing the purchase of all necessary raw materials and intermediate products only from the source that the licensor indicates.

In host countries where imports of raw materials are made independently by private domestic firms, there is very limited control over the price at which these raw materials are obtained when compared to competitive international prices. Vaitsos defines overpricing as: Price paid by subsidiary less Competitive price quoted internationally divided by Competitive price quoted internationally times 100. Using the above measure of overpricing, Vaitsos found that in the Columbian

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1. See Chapter II, Section 2, p.85.

pharmaceutical industry, overpricing accounted for the major source of income flows to the foreign parent companies. "Defining as 'effective returns' to the parent corporation the sum of reported profits of the subsidiary, royalty payments and intermediate product overpricing, the following data can be inferred from a sample representing close to 40% of the Columbian pharmaceutical industry. Reported profits constitute 3.4% of effective returns, royalties 14.0% and 'overpricing' 82.6%".[1]

The international firm's incentive to increase its income flow by overpricing intermediate products is obvious in the case of joint venture or license agreements since this leads to a redistribution of income from the investment favouring the foreign investor at the expense of the local partner. One also finds a tendency on the part of wholly-owned subsidiaries to purchase intermediate products from the parent firm at greatly inflated prices. The explanation lies in the presence of unequal trade barriers such as tariffs, taxes, maximum repatriation rates or the existence of tax havens. It is also possible that due to its monopoly patent rights, the subsidiary is making embarrassingly high profits as compared to the local firms and therefore feels compelled to reduce the book value of its profits by reporting higher costs.

In Egypt, when GOPCA took over the import of all pharmaceuticals in 1960, it made it clear that price competition was to be encouraged and respected within a restricted sellers market of 90 large reputable international firms to ensure quality (previous to the nationalisation of imports, the industry was importing pharmaceuticals from 340 foreign firms).

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1. Constantine V. Vaitsos, "Transfer of resources and Preservation of Monopoly Rents", Economic Development Report No.168, Development Advisory Service, Center for International Affairs, Harvard University, Cambridge, Massachusetts, 1970.

In spite of these considerations, a confidential report showed that as late as 1965, one of the subsidiaries had imported raw materials chemicals necessary for all its production of that year with a rate of 159% overpricing, where overpricing is defined in the same way as in the previous example for Columbia. The absolute difference between the total value at the price paid by that subsidiary and the total value at competitive prices for the imported chemicals was in fact larger than the sum of royalties plus profits transferred to the parent firm by the subsidiary in that same year.[1] Overpricing was a more important source of income than royalties and profits put together.

It is small wonder that GOPCA introduced a clause in its model or standard agreement document specifying that domestic production would be supplied with pharmaceutical raw materials from the licensor only if the prices charged by the latter were competitive with world prices.[2] This clause was applied to all new agreements after 1960.

In the case of license agreements with wholly domestically owned firms, the domestic firms themselves have an incentive to keep a watchful eye on the level and movement of prices of raw materials necessary for their production. One can observe many cases where argument and pressure are exerted on the licensor to bring his prices down to competitive levels. With relatively old or standard products, competing prices are obtained from among the international firms themselves. 'Nile' has asked one of its American licensors to review the price of one of its raw materials which was being offered by one of the large Swiss firms at half that price. With newer products, competing prices are usually obtained from Italian firms which do not observe patent rights and are quick to market innovations in their semi-finished form at greatly reduced prices. One British firm specifically included in

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1. Report obtained from Dr. Abdou Sallam, Minister of Health, Cairo, 1971.

2. See Article 8 of Standard Agreement Document, p.147.

its licensing agreement with Kahira that Kahira should be allowed to buy raw materials from any reliable international source with the exception of Italy.

When the licensor is the sole holder of the patent for an agreement product and there are no competing suppliers for the chemical ingredient, he becomes a pure monopolist and will charge whatever price he chooses to. A case in point is the active ingredient for the production of Lycanol,[1] a branded patented drug belonging to Bayer. This ingredient was priced higher than the finished preparation when directly imported. The licensee, Alexandria, refused to buy the ingredient or to produce the speciality until Bayer reduced its price three times.[2]

Italian producers have been the most efficient and competitive source of patented raw materials for GOPCA, and because they were also potential suppliers they provided a standard reference for GOPCA's negotiations with international licensors. The active ingredient for Terramycin - Pfizer's branded patented name for Oxytetracycline Hydrochloride - was made available from Italy at £80 per kilogram as compared to Pfizer-Egypt's parent price of £200 per kilogram in 1962. GOPCA asked Pfizer to reduce its price but Pfizer argued that Italian supplies were of doubtful quality and therefore not comparable for negotiation purposes. By the time GOPCA had performed the necessary tests on Italian samples of the product (which proved Pfizer's allegations to be false), it became aware of the corresponding circumstances of purchases by the Defence Supply Agency in America itself. General McNamara had approved the import of Italian supplies of the generic product in 1959 at about 67% of Pfizer's bid for the same product.[3] Continued negotiat-

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1. This drug stimulates the physiological secretion of insulin.

2. Interview with Dr. Hassan Abbass, Director of Planning, Alexandria Co., 1972.

3. F-D-C Reports, Drugs and Cosmetics, "The Pink Sheet", May 27, 1963, pp.3-6.

ions between GOPCA and Pfizer brought Pfizer's price down to £150, while the same Italian supplier was now offering the product at £40. The Director of Imports at GOPCA now decided that it would only accept to buy this raw material from Pfizer-Egypt's parent if it would sell it at £44, having allowed a 10% royalty on the estimated £40 cost of production. Pfizer refused this tender and discontinued the production and sale in Egypt of its most important speciality in that market at the time, 1964. Two Egyptian companies started producing the same drug, CID and Memphis, using imported raw materials from Italy.[1]

d) Interest payments

This is the one form of income flow which can only accrue to the foreign firm operating subsidiaries or joint ventures in the host country. Potential profits on capital invested in the pharmaceutical industry are higher than average, and this is the main reason why international pharmaceutical firms prefer to go it alone rather than engage in partnership or licensing agreements; "Merck,... originally tried to capitalize on the fruits of its research through licenses - one of the choices. ..., suffice it to say that generally speaking the results of this method were unsatisfactory as compared with other possibilities - such as exports or overseas operations."[2]

In Egypt, prior to the imposition of discriminatory sales taxes which will be discussed below, the following figures describe the profits of the three foreign subsidiaries after the payment of royalties, depreciation, administrative and advertising expenses, but before taxation.

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1. Interview with Dr. Moustafa Al Samaa, Director of Imports, GOPCA, Cairo, 1972.

2. Antoine Knoppers, Op.cit., p.5.

Table 14. Profitability of the Three Subsidiaries Operating in Egypt

Firm	Year	Profit percent Sales	Profit percent Capital Employed
Pfizer-Egypt	1966	34%	53%
Hoechst-Orient	1966	28%	115%
Swiss Pharma	1967	18%	52%

Source: Report Prepared for the Study of Prices of Subsidiary Products, by Pricing Committee, 1967.

Company tax is the same in all Egyptian industry, for private as well as public enterprise. The rate was raised to 30% after the 1967 war (it equalled 24% before the war); it is payable on profit net of depreciation and interest payments (to avoid double taxation). Like other pharmaceutical firms, the subsidiary must allocate 10% of profits to research. It must also by law reinvest 5% in government shares, and 5% in statutory reserves. Companies will generally distribute only part of the remaining profits, allocating the rest to provisions for growth, according to their own policy.

For whatever portion of profits is distributed, company law again requires that 75% of profits goes to shareholders and 25% to workers and employees of the firm.

To lighten the burden on the balance of payments, the Egyptian authorities have instituted a maximum repatriation rate of 50% of the final distributed profits accruing to the parent firm. If one looks at the figures for transferable subsidiary profits, they are as small as 2% of the parent's share of capital employed in 1965 and 1966.[1] This reflects the subsidiaries' policy of growth and also possibly a reluctance to risk asking for very large transfers in foreign currency, a step which might lead the Egyptian authorities to enforce more restrictions or perhaps even consider nationalisation of the concern.

1. Report Prepared for the Study of Prices of Subsidiary Products, Op.cit., 1967.

In 1967, the prices, profits, manufacturing and other costs of sales of the subsidiaries were all scrutinised by a specialised committee studying the prices of drugs charged by these firms. A similar committee had previously determined and fixed the price of imported drugs to the consumer, and later fixed and laid general rules on the pricing of drugs produced by the domestic firms.

The prices of subsidiary products are all higher than their locally produced equivalents.[1] The committee started by studying the importance of every drug to the consumer in relation to its manufacturing cost, allowing the addition of larger markups on those considered less vital medically. This is the type of judgment used in pricing drugs generally.[2] But the concept of a fair profit in relation to the subsidiaries' total operations had to be introduced; this involved comparing the cost breakdown of total sales as between domestic firms and subsidiaries. The following Table gives the summary of a detailed study of the allocation of expenditure for all the pharmaceutical firms. The first row gives the average for the seven domestic firms.

Table 15. Comparison of Cost Breakdown of Production between Subsidiaries and Domestic Firms, 1966.

Firm	Direct Costs	Indirect Costs				Profit	Value of Prod. ex. fac.
		Admin.	Dist.	Advert.	Total		
Av. Domestic	50.3%	5.7%	4.2%	3.5%	13.4%	36.3%	100%
Pfizer-Egypt	52.5%	6.6%	6.9%	6.1%	19.6%	27.9%	100%
Hoechst-Orient	51.2%	9.5%	9.6%	5.4%	24.5%	24.3%	100%
Swiss Pharma	43.2%	16.3%	5.1%	6.2%	27.6%	29.2%	100%

Source: Study prepared by the Pricing Committee, Op.cit., 1967.

The committee decided to apply the average total indirect costs incurred by the domestic firms as the standard necessary expenditure

1. See Price of Drugs Produced by Foreign Subsidiaries, Appendix p.157.

2. See Price Control in the Egyptian Pharmaceutical Industry, Chapter IV.

on these indirect elements of cost, and allowed a 'fair' profit of 25% to arrive at a new value of production which would be obtained by making the necessary reduction in prices ex. factory. In other words, it added 13.4% plus 25% to each subsidiary's direct manufacturing costs and subtracted the resulting value for production from the actual value of production. This difference it deemed a good measure of overpricing.

The committee further decided to reduce the 15% discount allowed to chemists on the retail price of subsidiary products to 10% which is equal to the discount allowed on imported finished pharmaceuticals. This further inflated the ex. factory value of the subsidiary's production by 5% of the retail value of this production.

The net reduction on the ex. factory sales value or average price charged by the subsidiaries was to be 17%, 20% and 20% for Hoechst-Orient, Pfizer-Egypt and Swiss Pharma respectively. A reduction of varying percentages was made on the different specialities to arrive at the total recommended reduction.

But by the time the study and recommendations were ready for approval by the higher authorities, the 1967 war took place and funds were badly needed to finance the war effort. Treasury taxes (sales taxes) were being placed on many consumer goods. The decision was therefore taken to reduce the sales receipts of the subsidiaries without an equivalent reduction in the price of their products to the public. The recommendation of the committee was now the application of a flat rate of treasury tax on all the products of each subsidiary by the same original percentage (and including the reduction in chemist discount), the burden of the tax falling entirely on the subsidiaries.

Two of the subsidiaries, Hoechst and Swiss-Pharma accused GOPCA's measures (the majority of members composing the committee were officials of GOPCA), of being discriminatory and liable to cause severe strain on

their profit and competitive position in the Egyptian market. They were represented by the countries' Commercial Attaches as well as by the Egyptian Ministry for Industry, which is responsible for their operation. The latter brought forward studies of the subsidiaries' accounts using full cost methods of calculation, and approached the pricing committee with suggested tax rates of 11.28% for Hoechst-Orient products and 8.36% for Swiss Pharma products. After a long exchange of memoranda on methods and definitions used for calculation, the final compromise was reached whereby both Hoechst-Orient and Swiss Pharma are paying treasury tax of 14% on ex. factory prices, and Pfizer-Egypt is still liable to 20%.

Before we turn to the gains to developing countries from allowing the operation of international pharmaceutical firms, we must take note of one additional and extremely important advantage to the foreign firm from operating through subsidiaries or license agreements in these developing countries.

As we have shown in Chapter I, the rate of innovation in the pharmaceutical industry in the West is perhaps the highest among research based industries. The average life span of any brand name is very short (the typical successful brand has a commercial life of under three years both in Europe and the U.S.). By producing in developing countries, the international pharmaceutical firm has the opportunity of lengthening the life of its old brand names which are now afforded protection from competing imports of other international pharmaceutical firms' old and new products. The reason why products can be sold longer in the protected market of developing countries is twofold. On the onehand, within every pharmaceutical group, the majority of successful innovations do not contribute any significant pharmacological improvement on existing brands and their success is a function of aggressive advertising.[1] On the

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1. See Chapter I, Section 3.

other hand, demand for any brand name is very slow to change in developing countries on account of the very large percentage of sales made without prescription, i.e. because of self-medication by patients who rely on past knowledge of effective drugs.[1]

Moreover, international pharmaceutical firms are not compelled to license the production of their latest innovations in developing countries and prefer to delay this until they are old; in the meanwhile they can and do achieve maximum unit profit on these new drugs by exporting them to developing countries which give them priority over other possible sources for imports of new products. In Egypt, it can be observed by looking at the source of finished drug imports in 1971 that the majority of manufacturers of these foreign drugs are also active inside Egypt, either through subsidiaries or through license agreements. These international pharmaceutical firms with manufacturing links in the Egyptian market, account in fact for over one half of the total number of imported drugs with FOB value over £E.1,000 in 1971.[2]

3. Gains to a Developing Country from the Operation of International Pharmaceutical Firms

Foreign investment of any form contributes to the growth of a host country's national income and employment through the usual multiplier effect, provided one can make the assumption that the economy is not operating at full employment and has sufficient internal elasticities so that the result is not merely inflation. In this respect, foreign capital investments in the pharmaceutical industry of developing countries can be a useful complement to domestic capacity for the production of drugs. The assertion was made in Chapter I Section 4 that the majority of developing countries will find it economic to undertake some form of

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1. See Chapter I, Section 2.

2. Author's analysis of all drugs imported into Egypt for 1971, according to manufacturer, brand name, and FOB value, and also quantity.

national investment in the pharmaceutical industry, defining 'economic' as leading to a positive social net benefit.

Any analysis of foreign operations in the pharmaceutical industry must therefore take into account the impact of such operations on the development of the purely domestic sector of this industry, delineating those forces which act as a hindrance and those which constitute an impetus to the growth of this sector.

A second aspect of foreign investment and one with considerable weight in decision making of the host country (as well as the lending country) is the influence of the capital transfer on its balance of payments. To developing countries, this is a very real problem because one of the principal aims of allowing the operation of foreign subsidiaries in the domestic industry is the conservation of foreign currency.

The long run effect on the balance of payments of a country receiving a new injection of foreign capital is known[1] to depend on the annual rates of growth of this capital as well as the annual amortisation rate and interest rates payable on this capital. If the rate of growth of the initial investment (from continued inflows of foreign capital or from the reinvestment of profits) is less than the interest rate (or the rate of repatriated profits to initial investment) received by the foreign investor, then the ratio of outflow to inflow of funds to a host country gradually becomes greater than one, and will hence cause problems to its balance of payments.

Outflows of funds from the operation of foreign pharmaceutical firms also include the purchase of raw materials from the parent company which, as we have shown in Section 2, normally will far outweigh any profit earnings repatriated by subsidiaries.

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1. E. D. Domar, "The Effect of Foreign Investment on the Balance of Payments", American Economic Review, 1950, pp.805-826.

Although the net result of the operation of the multinational firm's subsidiary on a host country's balance of payments is most likely to be negative, the rate of outflow of funds could be matched with exports from the subsidiary growing at the same rate of increase as this outflow.

Unfortunately, international pharmaceutical firms will seldom decide to export pharmaceuticals from developing countries in any meaningful volume. Even for Britain, where foreign owned firms account for approximately 73% of sales to the home market[1] and 49% of British exports to overseas markets in 1965, the net contribution of these foreign firms to the British balance of payments was almost nil.[2]

The most important group of drug manufacturers in Britain are United States owned. These companies which have set up extensive production facilities in the United Kingdom to serve as a basis for the supply of exports to Europe and the Commonwealth showed that in 1965, the value of their export sales from Britain was £20.2 million and yet the net result of their operations on the British balance of payments was a debit of £1 million.[3]

In judging the balance of payments effect of the operation of foreign drug manufacturers on its economy, a developing country should therefore realise that although foreign currency savings might be achieved in terms of the alternative cost of direct imports of finished drugs from the same foreign suppliers, the actual outflow of funds from these operations is most likely to outbalance the inflow.

A third aspect of foreign investment is its potential for transferring technology and know-how from advanced to developing countries.

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1. Report of the Committee of Enquiry into the Relationship of the Pharmaceutical Industry with the National Health Service, 1965-1967. Op.cit., p.101, Table 3.

2. Ibid., p.111, Table 20.

3. Ibid., p.111, Table 20;

In this context, one can compare the relative merits of different forms of investment in the pharmaceutical industry of developing countries. We shall discuss this feature of foreign investment in a comparison of the cost of the operation to Egypt of foreign subsidiaries as opposed to license agreements.

Egypt's experience with several of the possible foreign investment configurations in its pharmaceutical industry provides one with useful information to judge the costs and benefits of the different choices open to a developing country, and allows one to analyse the effectiveness of different policy instruments in the context of each of these choices.

Because of the imperfections of the market structure in the international market for pharmaceuticals Egypt has faced a bargaining situation with every choice available to it: borrowing capital from Russia to build a pharmaceutical plant, allowing international pharmaceutical firms to set up subsidiaries, joint ventures or licensing arrangements with international and local firms. Negotiation has also been possible over prices of imported finished and semi-finished pharmaceutical goods, a clear reflection of the monopoly position of both the foreign seller and the Egyptian government.

There is a high degree of indeterminacy with respect to the outcome of such bargaining situation since both bargaining parties can make great concessions without incurring actual losses. The bargaining strength of a developing country has been partly explained in terms of its stage of development and the sophistication of its government machinery. Although this functional relationship has theoretical validity, it ignores the influence of the economy's political framework which has a far more obvious impact on government control and hence bargaining strength. It is our purpose to show that government control takes the

decisive role in the outcome of the bargaining game, whatever stage of development the developing economy has attained, once we take the monopoly position of the foreign investor as given.

Given the structure of the international pharmaceutical industry and its supply conditions, the price paid for capital, machinery, know-how, intermediate and finished products by the Egyptian economy has been greatly influenced by the existing power and willingness of the government to control the importation, pricing, distribution and production of pharmaceuticals.

In Egypt, by 1958, after four years of study of the development planning for the pharmaceutical industry, a given number of projects were assessed as useful investments to form the basis for the growth of the pharmaceutical sector. A number of these were designed to expand and diversify the production capacity of the existing privately owned Egyptian pharmaceutical firms. This first group of projects was financed internally by foreign currency loans from the Ministry for Industry to the domestic firms involved, and the purchase of equipment and technology was made through license agreements, with international firms. The second group of projects involved the setting up of a number of plants for the manufacture of basic raw material chemicals used in secondary manufacturing by the existing pharmaceutical firms. Tenders were invited through the commercial sections of the Embassies of those countries with advanced pharmaceutical chemicals industries for foreign firms to set up and equip such plants and to train Egyptian staff in their management. The most competitive schemes came from a number of firms based in Europe. Yet capital was not forthcoming from those firms or the countries involved and the Egyptian economy lacked the foreign currency necessary for the finance of these projects. The choice lay in accepting Russian equipment and technology (since Russia

had offered Egypt a large fixed interest loan which Egypt was to allocate independently on different projects) or doing without that group of projects in the pharmaceutical industry. The first choice was taken.

At the same time, four offers came from international companies based in the West (one from a consortium of three large Swiss firms, two offers came from the U.S. firms and one from a German firm), to set up wholly owned subsidiaries in Egypt. After long negotiations on the terms of the agreements, these subsidiaries were accepted on a joint venture basis, the parent firms putting up 60% of the capital and private Egyptian shareholders buying the remaining 40%. Three of the subsidiaries involved were able to obtain loans from their governments or from international financial institutions.

A cost benefit appraisal of the operation of subsidiaries or of license agreements will usually distinguish between the direct and indirect effects on the host economy. In judging Egypt's experience, we shall try to assess the direct cost effects both in terms of the price paid for capital and the price paid for final goods. The indirect effects consist of the transfer of technology and know-how and their cost to the host country.

The setting up of subsidiaries involves the transfer of capital, the opportunity cost of which is the interest payable on loans available on the international capital market. But as we have shown in the case of Egypt, such loans from different governments or international institutions are normally restricted to the use of particular currencies (as in the case of Russia) or particular projects involving the cooperation of international firms, (Wyeth for instance was able to obtain a dollar loan for the construction of a plant producing infant milks in Egypt from the Development Loan Fund - Washington).

Although the interest payable on capital for the Russian built chemicals plant was only 5%, the technology transferred and the profitability of the project have on balance and in restospect shown themselves to be inferior to those obtained from the setting up of subsidiaries, but the economic study of this problem is reserved to Chapter IV Section 4, since the project is not directly comparable to the forms of investment under consideration here, on account of the differing nature of the production process involved in basic raw materials manufacture.

If we ignore the question of technology for the time being, it is possible to make the ad hoc judgment that since profits in the pharmaceutical industry are well above average the cost of capital transferred by international pharmaceutical firms will be higher than the cost of fixed interest loans in the absence of control by the host government on these profits. This is confirmed by the figures we have given in Table 14 on page 119, for the profits of the three subsidiaries in Egypt.

Turning now to the prices paid for the international pharmaceutical firms' products, we cannot measure it in terms of the prevailing price level for drugs. Actual time series or cross section data on the price of drugs reflect in the case of Egypt the pricing policy of the domestic pharmaceutical firms (including subsidiaries), which take the international prices quoted for trade as the upper limit on what they are allowed to charge, and the pricing policy of GOPCA which finally fixes prices according to the medical necessity of the different pharmacological groups of drugs. Prices charged by subsidiaries are therefore not directly comparable[1] to international prices or to prices of local

1. Prices of subsidiary products are lower than those quoted by the parent firms in the 1st year of production in Egypt, since GOPCA negotiates prices with the subsidiaries on the basis of international prices which must never be exceeded. But once prices have been fixed by GOPCA they are not reviewed regularly except in relation to subsidiary profitability.
In relation to the prices of local drugs, subsidiary drugs are generally higher priced, whenever there are exact local equivalents for comparison (see Table 25). But again, several subsidiary products are patented and do not as yet have local equivalents.

products!

What we can do is obtain a rough measure of the opportunity cost of drugs produced under license or by subsidiaries in Egypt, both in terms of the price of imported drugs and in terms of the cost of producing Egyptian equivalent drugs. We can then show that local production of the international firms' drugs will cost the Egyptian economy less than the direct import of these same drugs and more than the local production of equivalent drugs (meaning by equivalent drugs, drugs of the same chemical or generic composition.).

In 1960-61, the foreign currency requirement for the production of a large number of imported drugs was calculated in order to arrive at a measure of the foreign currency saving involved in producing this same set of imported drugs in Egyptian firms under license from the foreign firms concerned.[1] It was found that the total CIF cost of imported raw materials plus depreciation of imported equipment necessary for a year's production of the volume of drugs imported was just under 20% of the FOB value of these finished drugs if imported. If we remember that almost 100% of raw materials used by the pharmaceutical industry at this time was imported, we can take this 20% ratio as the real proportion of value of raw materials[2] content in imported drugs, (it is interesting to note that in spite of this measure depending on the FOB value of over 100 drugs, it is a stable average still obtained as late as 1971 in a separate study).[3] If we now calculate the ratio of other costs to the raw material cost of manufacturing in the pharmaceutical industry in 1960 we can relate total costs to the value of

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1. An example of this type of study was made available to the author, concerning the seventeen drugs produced under license from Schering.

2. Depreciation is also included, if not mentioned, throughout the analysis.

3. Study of Foreign Currency Cost of Drugs Produced Under License, prepared by Dr. Abd El Halim Haridy, Director of Statistics Department of GOPCA, 1971.

imported drugs. The most reliable figures we can use are those published by the Central Agency for Public Mobilisation and Statistics. This agency compiled 350 pages of data on the operation of the Egyptian pharmaceutical industry in the years 1960 and 1964-65.

Foreign subsidiaries were not yet in operation in 1960, and the figures therefore relate to the national private industry (nationalisation took place two years later). The method used for the measurement of value added is that of the United Nations Statistics Bureau. The source of the data is the accounts of forty-one concerns comprising the pharmaceutical industry at the time.

Table 16. Distribution of Value of Production at Input Cost for all Domestic Pharmaceutical Firms, 1960

	Value in £E.	% to total
Industrial Costs		52.4%
Raw Materials	1,018,281	
Packaging Materials	732,744	
Other Indust. Costs	225,175	
Services bought outside industry	558,200	14.8%
Depreciation	101,200	2.7%
Net Value Added		30.1%
Adjusted Rent	61,100	
Adjusted Interest	203,100	
Wages and Salaries	632,400	
Profit	240,200	
Production at Input Cost	3,772,400*	100.0%

Source of figures from The Central Agency for Public Mobilisation and Statistics, Op.cit., pp.331-345 and p.262.

* The book value for production at ex. factory prices in 1960 was £E.3,821,421. The adjustment (downward) is obtained by subtracting differences in the evaluation of inventories.

It must be mentioned that the above figures for costs which we shall use for our calculations seem to overestimate true costs, perhaps because all firms in 1960 were privately owned and would therefore tend to report higher costs of production to reduce their reported

profits for tax purposes. This suspicion is confirmed if we compare the figures for manufacturing costs other than wages and salaries (which are also lower in 1964-65) for 1960 with those compiled for 1964/65 when the industry was nationalised.[1]

Table 17. Comparison of Input Costs in Total Production of Domestic Pharmaceutical Sector Between 1960 and 1964/65

	Private Domestic Sector, 1960		Nationalised Domestic Sector, 1964/65	
Industrial Costs		52.4%		44.1%
Raw Materials	26.9%		26.6%	
Packaging Materials	19.0%		17.0%	
Other Indust. Costs	6.5%		0.5%	
Services bought outside industry		14.8%		6.9%
Depreciation		2.7%		2.7%
Net Value Added		30.1%		46.3%
Adjusted Rent) Adjusted Interest)	7.1%		7.3%	
Wages and Salaries	17.0%		12.0%	
Profit	6.0%		27.0%	
Production at Input Cost		100%		100%

Source of figures from The Central Agency for Public Mobilisation and Statistics, Op.cit., pp.331-345, and p.264.

We find that the percentage of raw material cost to production at factor cost is almost identical for the two years,[2] 1960 and 1964/65, at 26.9% and 26.6% respectively, whereas the percentage of other manufacturing costs plus services bought from other industries to production at factor cost is significantly lower in 1964/65 at 7.4%, as compared to 21.3% in 1960. Given the stability of the proportion of direct costs

1. Local pharmaceutical companies were nationalised over the period 1961-63 as described in Chapter II. The process of amalgamation resulted in the eventual structure comprising seven companies.

2. The similarity in the percentage costs of rent, interest and depreciation for the two years reflects the fact growth in capital employed was matched with equal growth in value of production.

of raw materials (which are all imported in both years)[1] in contrast to the sharp fall in the proportion of other manufacturing costs, we feel that this vast change cannot all be explained by increased efficiency.[2]

Turning back to Table 16, we have subtracted raw material costs, depreciation and profits from production at factor cost to arrive at the figure for all costs other than raw materials, its ratio to raw material cost is 2.37:1. (If the same procedure is applied to the figures for 1964/65, the ratio obtained is 1.63:1). This ratio allows us to relate the value of all costs other than raw materials and depreciation to the value of finished imported drugs at their FOB price in 1960. Since we have established that the percentage value of raw materials and depreciation to the FOB value of imported drugs in that year is 20%, and since we have calculated the ratio of other costs to cost of raw materials to be 2.37:1, then the percentage value of other costs to the value of finished drugs is,

$$20\% \times 2.37 = 47.4\%$$

We can therefore say that production of Egyptian drugs with foreign raw materials would have cost according to the 1960 cost structure of the industry a total of approximately 67.4% of the value of imported drugs, arrived at as follows:

Percentage cost of raw materials plus depreciation to FOB value of imported drugs	20.0% +
Percentage cost of all other factors of production to FOB value of imported drugs	47.4%
Percentage of total costs to FOB value of imported drugs	67.4%

1. See Chapter IV, Section 1.

2. Ex. factory prices of domestic products at which total production is valued remained very stable over the period, having been fixed at their 1960 level and frozen until the present, with the exception of some vital drugs which were gradually reduced in price.

The saving involved in national production is therefore 33% of the value of foreign drugs in 1960, and becomes even more substantial if we measure it using the more recent cost structure of 1964/65. The calculated saving (using the ratio 1.63:1, which imples a percentage cost of 52.6%) would be estimated at 47.4% in 1964/65.

The saving involved in domestic production by foreign firms (subsidiaries or license agreements) is also positive but lower than that achieved by local firms producing independently, because of the additional costs due to royalty payments and overpriced raw materials. This can be observed from a comparison of the cost structure between foreign subsidiaries and nationalised domestic firms.[1]

This kind of comparison is only valid if it can be shown that the products of subsidiaries and of local firms in Egypt are similar. We have therefore scrutinized the complete list of drugs manufactured by the subsidiaries in Egypt for the year when the comparison is made, 1964/65. Each drug was studied in terms of the quantity and value of its output, the raw materials used, and in relation to local equivalents. The results are summarised in Table 24 at the end of this section.

According to our study the majority of subsidiary products have identical Egyptian equivalents. This is because the products GOPCA approved for production at the subsidiaries date since 1958, when the joint venture agreements were signed between the Ministry for Industry and the foreign parent companies. By 1964-65, hardly any new products had been added to the approved list, while local companies had obtained the raw materials and know-how (mainly through patented licenses from

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1. To measure the saving involved in production by subsidiaries using the same 20% basis would be incorrect in view of the fact that we do not have the actual figure for the value of imported raw materials used in production of these subsidiaries. However, if we assume that costs of imported raw materials bear the same ratio of 20% to value of imported drugs, the calculated saving is 46.9%, after adjusting for the new cost structure.

foreign firms) to manufacture their own competing products of equivalent generic composition to those of the subsidiaries.

Table 18. Comparison of Input Costs in Total Value of Production Between Foreign Sector and Nationalised Sector in Egyptian Pharmaceutical Industry, 1964/65

	Foreign Sector (subsidiaries)		Nationalised Sector	
Industrial Costs		56.1%		44.1%
Raw Materials	35.0%		26.6%	
Packaging Materials	11.0%		17.0%	
Other Indust. Costs	10.1%		0.5%	
Services (bought outside industry)		10.4%		6.9%
Depreciation		3.0%		2.7%
Net Value Added		30.5%		46.3%
Adjusted Rent } Adjusted Interest }	5.5%		7.3%	
Wages and Salaries	10.0%		12.0%	
Profit	15.0%		27.0%	
Production at Input Cost		100.0%		100.0%

Source of figures from the Central Agency for Public Mobilisation and Statistics, Op.cit., pp.331-345, and pp.262-264.

Although products of subsidiaries are generally higher priced than their nearest local equivalents,[1] so that the value of their production at factor cost represents a relatively smaller volume of output,[2] the percentage cost of raw materials to this value of production is higher for the subsidiaries at 35% as compared to 26.6% for the local firms, the difference being 8.4%.

This significantly higher percentage cost of raw materials would not necessarily imply overpriced imports of raw materials, if it could be shown that the reason lay in the fact that subsidiaries undertake a smaller amount of manufacturing inside Egypt than their local competitors. But such an explanation would also require that the percentage

1. See Appendix p157, Table 25, for a comparison of the prices of drugs produced by subsidiaries with their Egyptian equivalents.
2. Table 24 p.155 shows that for almost every type of product considered, the percentage of total production accounted for by subsidiaries in terms of quantity is much smaller than in terms of value.

of other costs to the value of production be smaller for the subsidiaries when compared to the local industry's percentage. The figures in Table 18 show that this is not the case, since manufacturing costs plus services bought from other industries account for a higher percentage of production in the subsidiaries at 66.5% as opposed to 51% in the local sector, a difference of 15.5%. The payment of royalties (which is included in Services bought outside Industry) can only account for 5% of this difference, 5% being the maximum percentage allowed by the government as mentioned previously.

We have therefore shown that prices of imported raw materials used by subsidiaries are relatively higher than those used by local firms, a fact which is not surprising since most of the drugs produced by subsidiaries are patented. The magnitude of raw materials overpricing becomes obvious to the authorities over time, when competing raw material chemicals become available on the international market and their prices are compared with the prices charged by parent companies to their subsidiaries.[1] It is also suggested by the figures in Table 18 that subsidiaries perform a more limited amount of manufacturing than local firms (although this fact cannot explain the higher cost of imported raw materials as shown above). Figures for adjusted rent and adjusted interest, and for wages and salaries, show that capital employed and labour employed by the subsidiaries are both relatively smaller than in the local firms.

The actual difference in size of the labour force employed between the subsidiaries and the local firms is much larger than Table 18 suggests, for a number of reasons:

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1. One example was described on p. 116 ; more evidence on the extent of overpricing is given in a report by GOPCA, which is confidential.

-- Wage and salary payments are significantly higher per worker and per employee at the subsidiaries, as is shown in Table 19.

-- Subsidiaries also employ a much higher proportion of professional and highly skilled labour to total labour employed (see Table 19).

-- Thirdly, the number of persons employed in advertising and distribution (clearly non-manufacturing operations) are relatively higher for subsidiaries. This was found in Table 15, p.120, which showed that the advertising and distribution budgets of subsidiaries were relatively larger than those of Egyptian firms.

Adjusted interest is evaluated by the Central Agency for Public Mobilisation and Statistics at 4% of the total finance employed by companies (total liabilities, both fixed and current). The figures for percentage cost of adjusted interest plus adjusted rent to production at Input cost therefore reflect the fact that subsidiaries employ less capital in relation to their output than national companies. The ratio of production at Input cost to total funds employed (total liabilities) is higher for the subsidiaries at 0.89 as compared to 0.80 for the Egyptian companies. The ratio of production at Input cost to capital employed (fixed liabilities plus long-term loans) is also significantly higher for the subsidiaries at 2.1 when compared to the ratio 1.1 for national firms.

Average productivity of labour (production at Input cost divided by labour employed) is again markedly higher for the subsidiaries at £E. 8,369 as compared to £E. 2,694 for local firms.[1] If we measure capital to labour ratios, we find as expected that national companies use far more labour intensive production methods. The ratio of total funds employed to labour employed is £E. 9,422 for the subsidiaries as opposed to £E. 3,383 for the local firms.[2]

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1. Central Agency for Public Mobilisation and Statistics, Op.cit. p.353.
2. Ibid., p.353.

To summarise the results of our study on the comparative cost structure between the foreign and domestic sectors operating in the Egyptian pharmaceutical industry, it is evident that the difference in the breakdown of production at factor cost between the two sectors is significant. We have shown that subsidiaries engage in relatively fewer manufacturing operations, employing comparatively less capital and a smaller labour force. But these more limited production activities have not resulted in smaller costs of operations. We have thus found that in addition to higher priced raw materials and other manufacturing costs, subsidiaries also spend relatively more on royalty and other service charges (which are probably accounted for by advertising and promotion costs).

The idea that possibly greater efficiency in foreign companies' production methods might counterbalance other high costs is totally dispelled by looking at the figures for value added. From Table 18 one notes that the proportion of net value added to production at factor cost is 30.5% for the three foreign subsidiaries as compared to 46.3% for the seven nationalised pharmaceutical firms. Another measure of the contribution to national product of the two different sectors is the percentage of net value added to total funds employed in each; this percentage is found to be 27% for the foreign companies as opposed to 36.8% for Egyptian firms.[1]

The above conclusions bear some similarity to the results reached by the Sainsbury Committee in its comparative study of the operation of national and foreign owned pharmaceutical firms in Britain in 1965.[2] The cost structure of the Swiss companies in particular implied that they were importing raw materials from their parent companies at greatly

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1. Ibid., p.340.

2. Report of the Committee of Enquiry into the Relationship of the Pharmaceutical Industry with the National Health Service, 1965-67. Op.cit., the Financial Appendix, pp.99-112.

inflated prices and performing only minor processing and packaging operations inside Britain. The percentage cost of raw materials to total sales was 57% for Swiss firms as compared to a figure of 14% for British firms, and the percentage of direct costs of wages and salaries to sales was 0.67% for Swiss firms as compared to about 3% for the British firms.[1] In its comment on the figures, the Committee pointed out that: "The high percentage of material costs and the low percentage of direct salaries and wages of the companies owned in Switzerland reflect the relatively small amount of manufacturing undertaken by these companies in the United Kingdom. The prices paid to affiliated companies are not at arm's length."[2]

If we consider the fact that many of the drugs produced by subsidiaries or under license (in theory, all of their drugs produced in Egypt) cannot be produced by the host country independently of the foreign firms' assistance, then we are not in a position to compare social costs without analysing the transfer of technology effected by such production in the host country.

There is no doubt whatsoever that the Egyptian pharmaceutical industry has made substantial gains in learning from the operation of international pharmaceutical firms in its midst, a proposition all those engaged in the Egyptian industry will admit, even the most active critics of foreign manufacturers. The clearest proof of this is that although GOPCA is placing increasing restrictions over the number of new license agreements or licensed products allowed (because of their drain of foreign currency which is much higher than that attributed to Egyptian products),[3] Egyptian pharmaceutical firms are still seeking

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1. Ibid., The percentages are calculated using figures in Table 8, p.103, and Table 16, p.108.

2. Ibid., p.103.

3. See Study of Foreign Currency Cost of Drugs Produced under License, prepared by Dr. Abd El Halim Haridy, Op.cit.

the assistance of international firms wherever there are problems in production processes.

We feel, however, that the transfer of technology and know-how is much more direct and immediate in the case of license agreements than with the operation of subsidiaries. The following are some illustrations of the way in which Egyptian firms benefit from license agreements:

At the simplest level, the Director of Planning at Alexandria Company described how his firm had been producing a drug which consisted of a combination of active ingredients, but the resulting tablet invariably turned yellow in time. When this local firm started the production of a licensor's branded drug containing some of the same active ingredients, it was revealed that the problem could be overcome by combining the compounds in a different sequence in the processing stage. Alexandria Co. is now using the production method learned from the licensor on this particular drug with success.[1]

At a more complex level, another local firm - the Nile Company - is producing all the market's requirements of parenteral solutions, blood anticoagulants and blood plasma under license from Don Baxter, an American company. The preparation of these solutions involves advanced technical know-how and the most exacting standards of hygiene and quality control. When the license agreement is terminated the licensee will have acquired all the necessary experience and know-how to carry on a process which it has been using inside the walls of its own factory for a reasonable number of years (unlike the standard length of license agreements of five years for every individual product, the

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1. Interview with Dr. Hassan Abbass, Director of Planning, Alexandria Company, May, 1972.

duration of this agreement between Nile and Baxter is for twenty years, but the payment of royalties is limited to 5% of ex-factory sales with no additional payments towards advertising.[1]).

Another way in which local firms can benefit from an international firm's experience and which may be valuable in the first years of their life is related to marketing skills. One Egyptian firm arranged with an international pharmaceutical firm to have all its advertising and marketing methods organised by a team of experts from the parent company which also licensed the production of many of its specialities. In return, the local firm paid 5% royalty on all its sales, whether of licensed or of the local firm's specialities. Eventually, the cost of this arrangement became very high, as the firm's sales soared, but the managerial skills had been acquired by the Egyptian staff. The agreement was conveniently terminated before its legal duration, on the pretext that political relations between Egypt and the country of incorporation of the parent firm in question had been severed.

One of the most valuable gains of local firms from license agreements is the confidence these agreements generate among the consuming public. It becomes evident to both doctor and patient that the large international firms consider local Egyptian companies reliable enough to allow them to produce under their own highly reputable brand names. But when the agreement is terminated and the local firm is forced to stop using the foreign brand name and select its own new brand name for the same generic product, this leads to frustration, especially among patients who feel that they are being sold a different drug from that which is prescribed for them. This is the reason why local firms choose brand names that are as close as possible to the original foreign brand name.

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1. Terms of the agreement between Nile and Don Baxter for production under license of thirteen products the manufacture of which began in 1965.

This problem makes a very strong case for the outright use of generic or pharmacopeal names in Egypt, for all domestically produced drugs, whether licensed or not. In 1962, the Director General at GOPCA presented a memorandum in which he recommended that GOPCA should insist that any new products licensed for manufacture in local companies should be marketed under local brand names or the generic names of the drugs in question.[1] He further proposed that, the name of the licensor should appear together with the local brand name and licensee for a maximum period of six months after which the licensor's name should be come less prominent on the packaged product, and disappear altogether after one year. But this recommendation was not carried through because foreign firms opposed it and GOPCA did not feel that the measure was sufficiently urgent and there were other more imperative questions to be negotiated with the foreign firms.

In contrast to the complex interaction which license agreements create between licensor and licensee and the resulting benefits which accrue to local firms, the foreign subsidiary stands aloof from the host economy, an island of advanced technology. There is a consensus of opinion among leading pharmacologists and doctors in Egypt that contrary to the earlier belief that subsidiaries would be the most efficient source of learning for a new generation of graduates who would soon be absorbed into the local pharmaceutical sector, these subsidiaries have not transferred any of the acquired skills or production know-how to the rest of the industry.[2] This criticism has also been voiced by the

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1. Dr. Aziz Al Bindary, Memorandum for the Suggested Modification of Current Policies on the Production of Drugs under License, GOPCA, Cairo, 24 October 1962.

2. This opinion is widespread among research staff in various departments in the industry and at Cairo University, and is also recorded in the minutes of the meeting of the Technical Committee, GOPCA, 24 Oct. 1962, when the above memorandum was discussed by a large panel of physicians and pharmacologists.

Chairman of GOPCA's Board of Directors in a report assessing the role of foreign subsidiaries in the Egyptian pharmaceutical industry.[1] Dr. Abdou Sallam states that experience has proved it impossible for local firms to obtain any technical cooperation in production from the subsidiaries, since these consider themselves in competition with the Egyptian sector and refuse to divulge any of their patented know-how. It seems therefore that the sole gain to the Egyptian economy from the operation of subsidiaries and in terms of technology transfer, has been the training of staff and skilled workers who will eventually and if persuaded to, become employed in more directly useful occupations from the point of view of the Egyptian economy. So far, the setting up of subsidiaries in Egypt has in fact drained it to a certain extent of its existing skilled pharmaceutical personnel. With the incentive of much higher pay than in similar occupations in Egyptian firms, subsidiaries are able to attract and maintain their needs of chemists, pharmacologists, technicians and skilled workers. The following Table gives a comparison of labour employed and wages and salaries between the nationalised sector and the foreign sector in 1964/65.

At first glance, Table 19 seems to indicate that the entire pattern of employment differs significantly between the subsidiaries and the local firms, with the subsidiaries employing a far greater proportion of highly skilled and semi-skilled personnel, and also far less labour. But on closer analysis, it can be shown that the large difference in the comparative distribution of skills between subsidiaries and local firms is entirely due to the differences in the employment of one group only, unskilled labour.

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1. Confidential Report, Op.cit., 1971.

Table 19. Composition of Skills in Total Labour Employed by Egyptian Pharmaceutical Industry, 1964/65

Skill	Nationalised Sector (7 Companies)		Foreign Sector (3 subsidiaries)	
	No. of employees	% to total	No. of employees	% to total
Professional				
Medicine	44		13	
Pharmacology	217		33	
Chemistry	52		11	
Commerce	145		28	
Other	56		23	
Total	514	7%	108	18%
Intermediate				
Industrial	27		1	
Commercial	405		33	
Other	256		132	
Total	688	10%	166	27%
Other Skills				
Technical	69		2	
Non-technical	642		126	
Total	711	10%	128	22%
Unskilled	5323	73%	202	33%
Total Employed	7236	100%	604	100%
Av. Monthly Salary	£E. 31.071		£E. 65.744	
Av. Daily Wage (unskilled labour)*	£E. 0.465		£E. 0.641	

Source: Central Agency for Public Mobilisation and Statistics, Op. cit., pp.328-332.

* Actual wage per hour is £E..057 for nationalised sector and £E.0.093 for foreign sector.

This can be clearly demonstrated by dividing the number of employees in every individual group of skills, for the foreign sector and for the local sector, by the value of production of each sector.

Table 20. Ratios of Employment to Production in Public and Private Sectors of the Egyptian Phamaceutical Industry 1964/65

Skill Group to Production (ex factory Prices)	Nationalised Sector (7 companies)	Foreign Sector (3 subsidiaries)
Ratio of Total Professional skills to Production	33 : 1	34 : 1
Ratio of Total Intermediate skills to Production	43 : 1	52 : 1
Ratio of Total Other Skills to Production	46 : 1	40 : 1
Ratio of Total Unskilled Labour to Production	341 : 1	61 : 1

Source: Ratio calculated from figures from Central Agency for Public Mobilisation and Statistics, Op.cit. pp.328-332, and p.15.

Table 20 clearly shows that comparative employment of the first three groups of skills does not differ significantly between subsidiaries and local firms, especially the group of professional skills which thows almost identical ratios for both the nationalised and the foreign sectors. But a comparison of the ratios for unskilled labour employed between the two sectors shows a considerable difference which is even more striking than Table 19 suggests. For every pound's worth of production, the local companies employ 341 workers, which is more than five times the ratio employed by the subsidiaries.

The great disparity in the ratio of labour to production between local companies and subsidiaries cannot all be accounted for by differences in methods of production and reflects to a very large extent the policy of GOPCA which seeks to employ the largest possible number of workers in nationalised companies. This is clearly expressed by the Head of the Production Office of GOPCA when he affirms that one of the

chief targets of GOPCA is to offer employment to the largest possible number of workers.[1] He also asserts that through GOPCA's efforts, the companies in the public pharmaceutical sector have raised the total employment from 3,300 workers in 1960/61 to 8,000 in 1963/64 and that it is hoped that the figure would reach 10,000 by the end of the first five year plan and 22,000 by the end of the second five year plan. As a result of this policy, companies are under great pressure to increase their labour force at a much faster rate than required by increased production, an opinion shared by managers in most local companies.[2]

In view of the above considerations, and if one accepts that a relatively high level of employment is a benefit in itself, it would then seem that the local companies have achieved even better results than was judged by our comparison of production and costs between local firms and subsidiaries in the analysis of pages 134-138 . Local companies have thus been able to employ relatively far greater numbers of workers than the subsidiaries, and in spite of higher total wage payments than necessitated by the production process, the local companies were successful in absorbing the increased costs and still maintained higher levels of efficiency (value added to production) and profitability than the subsidiaries.

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1. Dr. Riad Zein El Din, "The Domestic Production of Drugs", paper presented to the Second Conference on Phamaceuticals, The Association of Pharmacists, Dar El Hekma, Cairo, 12 July 1964.

2. Interviews with Dr. Kamal Motawaa, Chairman of Memphis Company, and Dr. Mohamad Al Shahat, Chairman of Arab Drug Company, and representatives of Misr and Alexandria companies, Cairo, 1972.

Appendix to Chapter III

Main Clauses in Standard Licence Agreement Document

Article 1

Licensors grants to Licensee the right to manufacture in Egypt their Products mentioned in Appendix I attached hereto and such other pharmaceutical Products as may be agreed from time to time for a period of five years commencing on the date which the first Product is launched on the market. The manufacturing includes compounding, processing, subdividing and packaging of the Products.

Article 2

a) Licensee agrees to the manufacture and marketing of the Products under Licensor trade marks or trade names or under Licensee trade names or under pharmacopeal names at the option of the Licensor.

b) Licensor agrees that the Products shall be packed and marketed by Licensee according to the laws of Egypt.

c) Licensor undertakes to pay all costs and charges for maintaining the registration in Egypt of its trade marks during the term of this agreement.

Article 3

a) Licensor agrees to grant Licensee the "know-how" to manufacture the following Raw Materials as soon as Licensee advises Licensor of his readiness to manufacture them:.....

b) Licensor does not object to the manufacture of bulk or finished product with any local manufacturer the Egyptian authorities would indicate, pending the approval of the local manufacturers for those products Licensor has already committed.

c) Licensor shall prohibit his subsidiaries, agents and licensees from selling preparations covered by this agreement in Egypt.

Article 4

Licensor grants to Licensee the right to export or re-export the Products covered by this agreement to territories as specified in Appendix II.

Article 5

a) Immediately after this agreement has been signed and approved by the Egyptian authorities, Licensor will forward to Licensee the "know-how" of the agreement Products and Raw Materials agreed upon. [b, c),... g), all give details on the exchange of representatives for the purpose of the Licensee acquiring the know-how.]

Article 6

Licensor and Licensee undertake not to disclose to any third party any information, except where information is by law required by Government authorities, concerning the relations between Licensor and Licensee production control and sales methods, and technical and clinical data exchanged or evolved by virtue of this agreement. Further, Licensee will ensure that employees having access to the afore mentioned information undertake to preserve the secrecy of the information.

Article 7

Licensor shall receive annually, within two months of the publishing of Licensee's annual balance sheet, a net royalty amounting to 5% (five percent) calculated on Licensor's net wholesale price of the Agreement Products and on the Agreement Raw Materials. Remittance of royalty shall be effected in Egyptian, in Licensor's, or in any convertible currency.

Royalties shall be paid against complete "know-how" being complete descriptions of the methods of manufacture and control of the Products, active ingredients and Raw Materials agreed upon as well as all techniques in general in order to ensure a perfect production.

Article 8

As regards purchase of raw materials, a governmental organisation is presently handling all imports of pharmaceutical specialities, raw materials as well as medical requisites in Egypt. The said organisation

is setting tenders for raw materials, and importing at lowest possible prices from the world reputed suppliers. Licensee thus, is not allowed to import pharmaceutical specialities, raw materials or even medical requisites for his own account except through said organisation. Bulk raw materials will preferably be purchased from Licensor at world competitive prices. If purchased from other manufacturers Licensor will be ready to examine and analyse samples of purchased materials to establish their conformity with international standards or to standards to be decided by both parties.

[Article 9

(This agreement or any future amendments are subject to Egyptian legislation.).]

Article 10.

a) The term of this agreement shall extend five years from the date at which the first Product is launched on the market unless sooner terminated and will thereafter be automatically prolonged from year to year, unless one of the parties cancels the agreement by a registered letter despatched not later than six months preceding the expiration of the agreement.

[b) and c) reserve the right to either party to terminate the agreement.]

d) Licensee agrees that except with the prior consent in writing of Licensor, he will not apply trade marks or trade names covered by this agreement to any products manufactured or marketed by him after the termination of same.

Author's notes and clarifications:

With reference to twelve of the actual license agreements which were contracted in the period 1960-68, it is possible to elucidate the meaning and relevance of the above conditions to the contracting parties.

Article 1 and Article 10 Section a), together specify that while the term of the agreement is for five years for any specific product, the general agreement between the two parties can be prolonged by the addition of new products to the list of those products initially agreed upon. This means that the licensee pays royalty and other service charges (namely advertising contributions which are negotiated in a separate marketing agreement appended to the basic licence agreement shown above) for a maximum period of five years on any single product. After the expiry of five years from the date when the product was first marketed, the licensee can continue to manufacture this product, provided he does not use the licensor's brand name any longer (Article 10, Section d).

Article 2 gives the licensor the option to choose the name under which licensed products are marketed. In the twelve contracts studied, the licensor's brand name was chosen.

Section b) of Article 2, refers to the marketing laws of Egypt whereby all products are sold via GOPCA's commercial company which acts as the sole distributor of drugs to chemists and other retail outlets. Advertising and promotion however, are carried out by the publicity offices of the licensor which are run independently by his representatives and normally financed by a 10% 'advertising contribution' paid by licensee.

Registration fees are £E.5 per product in Egypt, an insignificant amount when compared to similar charges in most advanced countries.

Article 3 dictates that each license agreement must include the provision for the transfer of basic manufacturing know-how of at least one raw material agreed upon in negotiations. The value to Egyptian firms of the inclusion of this clause is discussed in Chapter IV.

Article 4 which lists the territories to which licensed products can be exported is a restrictive clause. In the twelve contracts studied, the only countries to which exports are allowed are Yemen. One exception was a contract that allowed the export or re-export of licensed products to "Arab and African countries with which Egypt has concluded treaties for preferential treatment of customs duties and in which Licensor has no agent or distributing organisation."

The definition of "net wholesale price" in Article 7 is gross ex-factory price less all normal discounts and price reductions granted to customers. All relevant taxes and transfer costs are paid by licensee.

The organisation referred to in Article 8 which handles all imports is the General Organisation for Phamraceuticals, pharmaceutical chemicals and medical Appliances, GOPCA.

Table 21. Value of Sales and Royalties for Production under Licence at Nationalised Firms 1966/67
Value in £E.

Firm	Value of Sales of Licensed Products (1)	Value of Total Sales (2)	Value of Sales of Products for which Royalties Paid (3)	% (1) to (2)	Royalties Payable for 1966/67	Contribution to Scientific Offices of Licensor	Estimated Value of Royalties for 1967/68	Number of Drugs Produced under License
Nile	288,842	2,867,283	288,842	10%	14,268	864	30,000	16
Ein Shams*	428,135	1,438,458	25,307	30%	1,269	28,848	5,000	26
CID	927,293	4,021,894	901,583	23%	40,287	62,735	57,418	54
Misr	1,084,064	2,413,064	69,120	45%	3,456	61,640	20,491	19
Memphis	13,879	2,089,723	13,879	7%	483	483	483	4
Kahira	64,187	2,571,884	22,744	3%	802	-	2,200	5
Arab	52,200	1,250,000	52,200	4%	2,088	-	5,812	1
Alexandria	478,015	1,248,305	478,015	39%	19.634	32,076	20,049	25
Total	3,336,615	17,900,311	1,851,690	19%	101,921	186,655	141,453	150
Comparison with 1965/66	2,988,386	17,804,443		17%	62,954	109,725		

Source: Technical Office, GOPCA, October 1967. * Ein Shams was merged into Nile in 1966.

Note: Column (3) shows that at three companies - Ein Shams, Misr and Kahira - the value of sales on which royalties are paid is substantially lower than the value of sales of licensed products, implying that several license agreements do not include royalty payments in foreign currency.

Table 22. Value of Production of Licensed Products 1966-1970
Value in £E. (ex-factory prices)

Licensee	Licensor	1966/67	1967/68	1968/69	1969/70
Nile	Baxter	297,618	299,399	372,731	450,675
	Evans	19,855	30,021	35,773	25,800
	Clin Byla	-	-	10,131	31,779
	Organon	31,449	88,954	203,691	293,691
	Richter	-	28,407	88,943	130,171
	Biochemie	-	-	2,162	144,186
	Delalande	35,391	47,683	27,136	65,157
CID	Schering	648,936	979,365	990,981	965,389
	B.D.H.	1,225	9,104	12,746	23,539
	Carlo Erba	195,652	205,469	270,919	308,080
	Berna	19,579	22,882	9.610	29,772
	Wyeth	33,875	20,468	33,576	34.850
	Aaron	-	-	37,932	75,047
Misr	Delft*	1,448,761	1,155,823	-	27,650
	Lepetit	11,638	11,197	12,849	475,763
Memphis	Roussel	12,090	12,626	9,352	13,835
Kahira	Merck Sharp	7,050	201,634	345,921	615,003
	Smith Kline & French	-	737	160,792	280,989
Arab	Medimpex	32,024	26,788	63,007	344,855
Alexandria	Bayer	293,307	265,224	158,160	367,436
	Hommel	9,798	1,441	8,149	54,620
	Mowath & Moore	179,412	323,448	60,745	175,490
Total Value of Licensed Production		3,278,690	3,740,670	2,904,765	4,933,777

Source: Department of Statistics of GOPCA.

* The significant decline in the figure for total value of production for 1968/69 is due to the agreement between Misr and Delft (a Dutch firm) on the production of 18 licensed drugs having been terminated in that year. Misr continued the production of these drugs under its own and newly chosen brand names. In 1969/70, Delft licensed the production of another drug which accounts for the figure shown above.

Table 23. Total Foreign Currency Cost of Licensed Products (Royalties plus CIF Value of Raw Mterials), 1966-70. Values in £E.

Licensee	Licensor	1966/67	1967/68	1968/69	1969/70
Nile	Baxter	198,002	20,600	159,072	196,880
	Evans	8,660	15,427	10,083	11,262
	Clin Byla	-	-	5,204	13,775
	Organon	13,570	42,664	81,675	128,505
	Richter	-	18,497	43,692	57,465
	Biochemie	-	-	925	56,232
	Delalande	13,416	17,973	10,024	26,353
CID	Schering	297,516	466,924	483,403	506,867
	B.D.H.	572	4,083	6,889	8,879
	Carlo Erba	86,689	95,013	111,499	135,555
	Berna	8,987	13,015	11,408	13,074
	Wyeth	11,517	6,958	13,904	11,849
	Aaron	-	-	15,409	25,516
Misr	Delft	506,769	402,100	3,980	12,166
	Lepetit	4,524	4,805	11,347	197,955
Memphis	Roussel	4,786	4,864	889	8,050
Kahira	Merck Sharp	3,009	79,384	176,477	298,699
	Smith Kline & French	-	6,570	69,318	120,349
Arab	Medimpex	13,269	14,883	25,490	120,208
Alexandria	Bayer	117,413	122,977	94,652	176,014
	Hommel	3,796	2,087	9.289	24,533
	Mowath & Moore	69,558	138,369	37,136	74,516
Total Cost		1,362,055	1,477,192	1,381,765	2,224,702

Source: Department of Statistics of GOPCA.

Table 24. Production of Drugs by Subsidiaries in Relation to Total Domestic Production, in Quantity and in Value, 1964/65

Generic Name*	Unit	Dosage Form	Quantity	% to Total Dom. Prod.	Value £E 1000	% to Total Dom. Prod.
Tetracyclin + Oleandomycin, "Sigmamycin"	1000	cap.s	1,834	100%	162	100%
"	litre	syrup	11,924	100%	145	100%
"	1000	vial	9.5	100%	1.7	100%
Oxytetracyclin, "Perramycin" 100mg	litre	syrup	10,328	98.4%	133	99.1%
" 250mg	1000	ampoule	140	100%	57	100%
" 250mg	1000	cap.s	693	33%	60	50%
Penicillin 400,000 U	1000	vial	318	2%	20	6%
Penicillin + Streptomycin	1000	vial	1,073	5%	106	7%
Tetracyclin, 100mg	litre	syrup	4	1.6%	.06	0.8%
Other Combinations	kg	oint.	2,357	100%	44	100%
"	1000	supp.	82	45%	5	39%
TOTAL ANTIBIOTIC GROUP					884	20.2%
TOTAL VITAMINS (no patented raw materials)					330	41.9%
TOTAL ANTIPYRETIC (No patented raw materials but see Dipyrone below)[a]					525	33%
Mixed Enzymes	1000	tablet	27,452	90%	144	94%
TOTAL DIGESTIVE GROUP (lipotropics, anzymes and proteins					152	13.6%
TOTAL BRONCHO-PULMONARY GROUP					18	1.6%
Iodochlorhydroxyquinoline and combinations of same + sulphas, "Enterovioform" and "Nimarol"	1000	tablet	22,149	41%	221	62%
	litre	syrup	17,209	15%	49	24%
TOTAL ANTIDYSENTERIC GROUP					270	36%
Sulphisomidine,	1000	tablet	1,372	100%	11	100%
"Elkosin"	litre	syrup	5,788	100%	15	100%
TOTAL SULPHAS GROUP					26	3.7%

Generic Name*	Unit	Dosage Form	Quantity	% to Total Dom. Prod.	Value £E 1000	% to Total Dom. Prod.
Supra-renal Gland Hormones						
5 mg	1000	tablet	5,159	76%	203	92%
5 mg	kg	oint.	50	100%	4	100%
10 mg	1000	ampoule[b]	9	16.8%	2	62%
Testicular Hormones						
50 mg	1000	ampoule	12	42%	4	43%
100 mg	1000	ampoule	11	30%	5	37%
500 mg	1000	ampoule	10	39%	8	41%
Mixed Hormones	1000	ampoule	15	100%	6	100%
TOTAL HORMONE GROUP					236	41%
TOTAL ANTISPASMODIC GROUP					144	26.7%
TOTAL OPTHALMIC GROUP					52	14.7%
Tolbutamide "Rastinon"	1000	tablet	24,932	88%	232	93%
TOTAL ORAL ANTIDIABETIC					232	93%
TOTAL DERMATOLOGICAL GROUP					32	13%
TOTAL NEURO-SEDATIVES HYPNOTICS AND TRANQUILIZERS					87	35%
TOTAL ANALEPTICS AND STIMULANTS					70	65%
TOTAL ANTIHISTAMINICS GROUP					22	28%
TOTAL CARDIACS AND VASCULARETICS AND HYPOTENSIVES					26	35%
Sennoside (A & B) "Pursennide" CATHARTICS					7	100%
Acetyl Digitoxin 0.2 mg. "Acylanid"	1000	tablet	674	100%	5	100%
0.5 mg. "	1000	litre	733	100%	13	100%
TOTAL CARDIAC GLYCOSIDES					18	100%
TOTAL OTO-RHINO-LARYNGETICS GROUP					58	25%
OTHER GROUPS (Orodentals and Urologics)					16	
TOTAL OF ALL GROUPS					3,198	17.04%

Source: Central Agency for Public Mobilisation and Statistics, Op.cit. pp.22-120 and pp.266-315. Also the Index of Medical Specialities, published by GOPCA, 1969.

The Column headed Generic Name gives detail of both the generic (official) name of the drug as well as the brand name under which the preparation is sold (in inverted commas). For those drugs for which the exact quantities of production could not be ascertained, only the group totals (which might include several preparations) are given under this heading, together with the value of production of the total group.

a - The value of patented brands of Dipyrone imported as raw material chemicals for the production of the subsidiaries in 1964/65 are: £E 146,000 of "Novalgin", the brand name used by Hoechst-Orient for Dipyrone, £E 74,000 of "Baralgin" (a combination of Dipyrone plus two other active ingredients), and £E 1,000 of "Novalgin-Quinine".

b - The figures for production ampoules is for 1965/66 because these for 1964/65 could not be ascertained.

Table 25. Price Comparison of Subsidiary and Local Drugs for Identical Generic Compositions - Retail prices in £E

Dosage Form	Subsidiary Product Name	Price	Local Equivalent Name	Price	Generic Name
16 caps. 250 mg.	Terramycin	1.69	Oxytetrin	0.70	Oxytetracyclin HCL
16 caps. 250 mg.	Sigmamycin	1.79	Sigmacid	1.40	Tetracyclin Hcl + Oleandomycin
30 tab. 25 mg.	Niamid	0.42			Nialamide
30 caps.	Viterra	0.35	Vi.ci.Ferrol	0.26	Vitamins & Minerals
20 tabs. 250 mg.	Doriden	0.17	Dormine	0.16	Glutethimide
20 tab.	Elkosin	0.22			Sulphisomidine
			Gantrinil	0.30	Sulphisoxazole
			Renosulfan		
10 tab.	Optalidon	0.08	Calmidon Kahira		Amidopyrine + Barbituric Acid + Caffeine
30 tab.	Rantozyme	0.28	Zymogen	0.25	Protease + Lipase + Amylase + Pepsin + Cellulose
20 tab. 10 mg.	Autrenyl Duplex	0.28	Curenil 2 mg.	0.20	Oxyphenonium Bromide
15 ml.	Coramine	0.28	Coracid	0.10	Niketh amide 25%
15 ml.	Coramine Ephedrine	0.29	Cardiamine Ephedrine	0.10	Nikethamide 250 mg. + Ephedrine HCL
500 tab.	Enterovioforme	5.00	Paramibe	2.00	Iodochlorhyd-Roxyquinoline

Dosage Form	Subsidiary Product Name	Price	Local Equivalent Name	Price	Generic Name
20 tab.	Asmac	0.26	Asmacid	0.15	(Pulmonic)
20 tab.	Antistine	0.25	Histazine	0.20	Antazoline HCL
0.1 ml. 50 tab.	Serpasil	0.19	Ravoline	0.15	Reserpine
20 tab. 500 mg.	Novalgin	0.18	Novacid	0.14	Dipyrone
Tab, 5mg.	Hostacortin (10 tab)	0.31	Oricortone (20 tab)	0.28	Prednisone
20 tab. 500 mg.	Rastinon	0.25	Diabetol	0.20	Tolbutamide

Source: Department of Statistics of GOPCA and Index of Medical Specialities (published by GOPCA).

Pfizer produces 11 brand names in 21 dosage forms.

Swiss Pharma produces 36 brand names in 53 dosage forms.

Hoechst Orient produces 20 brand names in 38 dosage forms.

Note: The sale of subsidiary drugs listed in Table 25 accounts for more than 75% of total subsidiary sales (including for each drug its various dosage forms).

Chapter IV.

APPRAISAL OF DOMESTIC PERFORMANCE UNDER GOVERNMENT CONTROL

In Chapter II we have reviewed the changes in the economic framework in which domestic production has developed in the period 1952 to 1963, and have also given an account of the role and responsibilities which GOPCA has finally assumed as the supreme advisory body controlling imports, production and distribution of pharmaceuticals. We are now in a position to analyse the performance of the public pharmaceutical sector in the twelve year period, 1960-71, for which we have obtained comprehensive data for all the relevant indices of growth in production, investment, value added, prices and profitability.

Section 1 of the present chapter begins with a broad description and analysis of the performance of the public pharmaceutical sector as a whole (including the Nasr company for production of basic pharmaceutical chemicals and the public company which produces packaging materials), followed by a more detailed study of the seven pharmaceutical processing firms alone.

Section 2 looks at the pricing policy of GOPCA and its impact on the profitability of the seven pharmaceutical firms.

In Section 3, the role of GOPCA is assessed for its influence on present and future growth of the industry, with special reference to the critical impact of import restrictions on the performance of the industry.

Section 4 is devoted to a close examination of the problems which the industry has experienced with backward integration, as shown in the performance of the Nasr company for pharmaceutical chemicals.

1. Investment, Production and Value Added

As explained in Chapter II, private domestic firms were set up in the pharmaceutical industry as early as 1937. By 1952, there were approximately fifty such establishments engaged in the final processing of drugs into their dosage forms. With the exception of Memphis company (which specialises in the extraction of active substances from local medicinal plants) and some very small laboratories selling household preparations, growth of the industry was very slow and total sales of domestically produced drugs had reached only £E. 485 thousand at retail prices[1] by 1952.

The existence of idle capacity in the pharmaceutical industry in the mid-fifties was discussed in Chapter II with particular reference to the limited market available for the drugs manufactured by domestic firms. Egyptian drugs were unable to compete with foreign preparations which dominated consumers' preferences.

The supply of foreign drugs in Egypt can be seen from the figures in Table 26 to have a very considerable influence on the sale of domestic drugs. Imports fell in 1956 as a result of the Suez War and the economic blockade on Egypt, and sales of domestic drugs almost doubled in the same year to a level which was more or less maintained, indicating an ability to meet demand that had previously remained unexploited.

Table 26. Import and Sale of Drugs, 1952-57, £E thousand

Year	1952*	1955	1956	1957
Imports	4,365	5,778	4,702	5,273
Sales of Dom. Prod.	0,485	0,867	1,653	1,696

Source: Egyptian Federation of Industries Yearbook, 1957-58, Cairo, p.152. The source does not specify the prices at which imports or sales are valued.

* Figures for 1952 from Table 30, p.165.

1. See Table 30 , page 165.

Investment in the pharmaceutical industry was one of the prime objectives of the first plan for industrialisation in 1957. Substantial loans were made available by the Ministry for Industry to the larger private firms for the expansion and diversification of their production capacity, with emphasis on the installation of new and modern facilities for the manufacture of vital drugs such as penicillin, streptomycin and insulin.

Table 27 gives a comparison of production according to dosage forms for 1956, 1957 and 1960 and also compares existing capacity between 1957 and 1960.

Table 27. Production and Capacity in the Pharmaceutical Industry, 1956, 1957 and 1960

Dosage Form	Unit	Production (Quantity)			Capacity (Quantity)	
		1956	1957	1960	1957	1960
Ampoule and Vial	million	14.3	17.1	46.8	43.5	77.1
Tablet	million	190	232	421	530	1220
Capsule	million	0.0	0.0	4.2	1	17.5
Suppository	million	0.3	0.4	1.2	2.3	4.1

Source: Figures for 1956 and 1957 obtained from Egyptian Federation of Industries, Op.cit., p.151. Figures for 1960 obtained from Memo presented at the first meeting of the Consultative Committee, GOPCA, Op.cit. (1960 figures relate to the ten largest firms only). A comparison of production and capacity in some dosage forms is omitted here because the units used are not comparable.

Table 27 clearly shows a significant increase of productive capacity in the major dosage forms between 1957 and 1960, as a result of the considerable financial support from the government in this period. The production capacity for ampoules and vials increased by 43%, that for tablets increased by 130%, suppositores by 80% and capsules by 1,650%.

The following Table gives production figures in quantity and value for the ten largest pharmaceutical companies, which accounted for 85% of the total value of production of the industry in 1960.

Table 28. Production and Existing Capacity of Ten Largest Domestic Companies in 1960. Values in £E thousand

Dosage Form	Unit	Quantity Produced	Value of Production £E 1000	Production Capacity (quant.)
Antibiotics	1000 ampoule	20.1	900.5	30.8
Syrups, Solutions & Extracts	1000 litre 1000 bottles	668.7) 8136)	890.6	1543.5 9240
Tablets	1000 tablet	420.8	786.2	1220.4
Granules "	1 ton 1000 packages	55.8) 1134.9)	87.4	190.1 1226
Powders "	1 ton 1000 packages	151.3) 16.9)	37.4	242.9 45
Capsule	1000,000	4.2	30.0	17.5
Ampoule & Vial	1000,000	26.7	523.2	46.3
Suppository	1000	1223.1	18.8	4086.1
Ointment & Cream "	1 ton 1000 packages	21.7) 3080.4)	150.1	311.9 4100.0
Total Value of Production in £E thousand			3,423	

Source: Summary Report on Birth of GOPCA and its Activities, Memo presented at the first meeting of the Consultative Committee, GOPCA, 6 Nov. 1962.

Note: Because the manufacture of antibiotics (mainly penicillin, streptomycin and their derivatives) requires specialised production installations and because of the critical importance attached to the output of this group of drugs, the existing capacity and production figures for this group are given separately at the top of the Table.

It can be seen from Table 28 that production capacity was far greater than actual production figures recorded for 1960. Indeed, only two-thirds of newly installed capacity for the production of antibiotics was being used, 62% for powders, 57 for ampoules and vials, 33% for tablets, 30% for suppositories and 24% for capsules. This unused capacity was rapidly utilised in the following years and allowed for considerable expansion in the output of the firms.

By 1960, the total domestic pharmaceutical sector comprised forty-one private local companies, according to the census taken by the Central Agency for Public Mobilisation and Statistics. These

companies were gradually reduced in number and merged into seven large companies after nationalisation which began in 1961.[1] The following Table describes the development in production of the entire pharmaceutical sector from 1960 to 1971/72.

Table 29. Development in Production of Pharmaceutical Sector, Valued at existing ex-factory prices £E millions

Year	Foreign Subsid-iaries	Local Pharm. Cos.	Nasr Chem. Company	Packaging & Other *	Total Production of Sector
1960	-	3.821	-	-	3.821
1961/62	-	5.100	-	-	5.100
1962/63	1.200	8.200	-	-	9.400
1963/64	2.300	11.200	-	-	13.500
1964/65	3.278	15.881	0.329		19.488
1965/66	4.500	20.216	0.451		25.167
1966/67	4.300	18.100	1.143		23.543
1967/68	3.600	19.070	1.074		23.744
1968/69	3.968	20.856	0.874		25.698
1969/70	5.752	25.248	2.323	1.868	35.191
1970/71	6.972	29.443	3.610	2.427	42.452
1971/72	7.800**	33.400**	n.a	n.a	n.a

Source: Figures for 1960, 1964/51965/66 taken from Central Agency for Public Mobilisation and Statistics, Op.cit. Figures for 1962/63-1967/68 from Statistics Department of GOPCA. Figures for 1968/69-1970/71 from balance sheets of all firms.

* Production of Packaging company not known for period up to 1968/69 and accounts for over 80% of figures given for 1969/70 and 1970/71, remaining 20% attributed to Opticals company.

** Figures taken from Ahmad Aly Gaber, Problems of Domestic Distribution in the Pharmaceutical Industry, M.A. Thesis in Business Administration, Ein Shams University, 1973, p.78.

Notes: Production of pharmaceutical companies consists of drugs and non-drug products, the latter accounting for 2.7% of total in 1960, 2.02% in 1964/65, 2.05% in 1965/66, and 3.5% in 1970/71.

1. See Section 3 of Chapter II.

Total production has proceeded to grow at a very high rate between 1960 and 1965/66. In this six year period, the major increase can be seen in the growth of production of the large domestic firms which were nationalised and amalgamated in the period 1961-63. From 1960 to 1965/66, production of the local pharmaceutical firms thus grew by 430%, a much higher rate of growth than the 128% in total domestic consumption[1] in this six year period, during which GOPCA also reduced its expenditure on imported drugs by 43%.[2]

Two of the foreign subsidiaries - Pfizer-Egypt and Hoechst-Orient - began producing in 1962/63, and the third subsidiary - Swiss Pharma - started production in May 1965. The increase of 280% in production of the foreign subsidiaries for the period 1962/63 to 1965/66 is therefore not as significant as the rate would suggest, since the manufacturing plants of these subsidiaries were not yet on-stream in those years. Similarly, producion of the Nasr Chemicals plants only started in 1964/65 and was not on-stream for another three years.

By the end of 1962, the ten largest local companies accounting for 85% of domestic output had been nationalised. Their capital employed amounted to £E 6 million and GOPCA boasted an increase of 45% in their sales[3] over the previous year, when the state first participated in their capital. Table 29 shows an increase of 61% in production of all domestic firms over the same one year period. This considerable increase in production and sales was made possible by the existence of unused capacity in the firms, and by the significant rise in total demand unaccompanied by a matching increase in imported drugs. In the two year period 1960/61 and 1962/63 consumption rose by 51% while drug imports fell by 3%, and the percentage of domestic drugs

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1. See Table 30 p. 165.
2. See Table 46 Section 3 of the present Chapter, p. 202.
3. Summary report on Birth of GOPCA and its Activities, Op.cit.

to total consumption rose from 28% to 53%, as can be seen from Table 30.

Table 30. Growth in Consumption of Drugs at Retail Prices, Value in £E millions

Year	Consumption of Imported Drugs (1)	Consumption of Locally Produced Drugs (2)	Total £E mil. (3)	Consumption Index 60/61 = 100	Percentage (2) to (3)	Consumption per Capita (3) ÷ Pop. £E
1952/53	4.365	0.485	4.850	33	10%	0.22
1960/61	10.600	4.300	14.900	100	28%	0.58
1961/62	9.300	7.900	17.200	115	45%	0.64
1962/63	10.400	12.100	22.500	151	53%	0.82
1963/64	9.500	16.000	25.500	171	62%	0.91
1964/65	9.610	21.390	31.000	208	69%	1.08
1965/66	8.000	26.000	34.000	228	77%	1.15
1966/67	6.800	27.800	34.600	232	81%	1.18
1967/68	5.340	27.900	33.240	223	82%	1.08
1968/69	5.140	33.000	38.140	256	86%	1.16
1969/70	5.932	39.079	45.110	302	87%	1.36

Source: Statistics Department of GOPCA.

In 1962/63, GOPCA continued to expand capital investment by building the latest andmost modern of all existing pharmaceutical firms, Nile at a starting cost of £E 1.25 million to begin production in 1963. GOPCA also decided to buy a small private establishment, the Arab company, which had scope for expansion and added to it existing machinery and equipment taken from the smallest three newly nationalised laboratories. Total funds employed in 1962/63 (fixed and current liabilities) stood at £E 115,845 for the Arab company.

Growth in total production of the pharmaceutical sector was interrupted in the two years 1966/67 and 1967/68, as a result of the reduction in raw material imports which began one year previous[1] to the war of June 1967. The shortage of imported raw materials proved to be just

1. See Section 3 of the present Chapter for a detsiled explanation.

as critical to the country as the shortage of imported drugs had been in 1956 since the result was the same inability to satisfy existing demand. The growth in consumption was held back in 1966/67 and then suffered a reversal in 1967/68 with a 4% fall in total consumption.

Figures for the development in production in Table 29 can be studied in conjunction with those describing the development in imports of raw material chemicals to give an idea on the extent of backward integration in the pharmaceutical industry and its dependence on imported chemicals. Data in Table 46 describing the development in expenditure of foreign currency on the import of chemicals by GOPCA does not give an accurate picture for the years 1960 to 1963/64 because GOPCA was assigned in the first years of its operation the task of importing chemicals such as pesticides for sectors other than the pharmaceutical industry.[1] However, figures can be obtained on the cost to Egyptian firms of imported pharmaceutical chemicals actually used in production for the years 1960, 1964/65[2], and 1968/69 to 1970/71.[3]

The percentage value of raw material chemicals employed to the value of production at ex-factory prices in local firms was 26% in both 1960 and 1964/65, and can be seen to have fallen to somewhere between 14% and 20% in the late sixties. Raw materials actually imported in any given year are not necessarily used in that same year, and final reports by GOPCA point out for instance to a great depletion in stocks in the three years 1966/67 to 1968/69.[4]

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1. Memorandum on the Functions of GOPCA, 6 Nov. 1962, which reports that GOPCA imported £E 13 million's worth of pesticides for the Ministry of Agriculture, £E 1.5 million of pharmaceutical chemicals of which £E½ million were for Ministry of Health laboratories and £E 1 million for production of pharmaceutical companies. Official figures on raw material imports according to Table 46 for 1961/62 give £E 2.5 million F.O.B.
2. Central Agency for Public Mobilisation and Statistics, Op.cit.
3. Figures for 1968/68 to 1970/71 found in final annual reports of GOPCA, and relate to operation of seven public companies plus Nasr.
4. See Section 3 of the present Chapter, p. 202.

In order to perform a similar calculation for the proportion of imported raw materials used in the production of the three subsidiaries, the only reliable figures are those of 1964/65.[1] These show that the percentage of imported raw material chemicals used in their production (ex-factory prices) was 34% in that year, as compared to 26% for the local firms. When it is also remembered from Chapter III that prices of drugs produced by subsidiaries are higher priced than similar products of domestic firms, it becomes evident that the percentage cost of raw materials used by subsidiaries is much higher than its counterpart in local firms.

The decline in the proportion of imported raw materials used in production of the public firms over the period 1964/65 to 1970/71 would seem to be a result of backward integration in the pharmaceutical industry. The production of basic pharmaceutical chemicals by Nasr rose by a factor of ten in this same period, while the increase in imported pharmaceutical chemicals was comparatively small at 65%. But such a deduction would overestimate the importance of Nasr in reducing the total dependence of the pharmaceutical industry on foreign raw materials. As will be detailed in Section 4, Nasr itself employs for its production a higher percentage of imported chemicals than other local processing firms. Moreover, the ex-factory prices at which Nasr sells its output to the processing firms (only the nationalised firms use Nasr output), are approximately twice the level of international prices (Aspirin, Chloramphemicol, penicillin, and sulphas in their bulk form). These two observations mean that the decline in percentage raw material imports are large due to other reasons which will be investigated when studying the performances of the seven processing firms.

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1. Figures taken from the Central Agency for Public Mobilisation and Statistics, Op.cit.

Turning now from production to investment for the public pharmaceutical sector as a whole in the period 1960 to 1970/71 we have obtained three separate groups of figures which we have tabulated below .

Table 31 describes total investment expenditure for the period 1960-65 according to the revised five year plan of the public pharmaceutical sector for which increased allocations were made in 1963.

Table 31. Total Investment Expenditure in Public Pharmaceutical Sector according to revised five year plan for 1960/61 to 1964/65.
£E millions

Nasr	Nile	Ein Shams	Arab	Kahira	Alex.	CID	Misr	Memphis	Other	Total
5.976	1.296	0.358	0.950	0.492	0.151	0.693	0.314	0.250	0.505	10.986

Source: The Treasury, Approval for GOPCA Annual Finance, 30 June 1963. 'Other' includes the distribution company and depots belonging to GOPCA. Ein Shams was merged into Nile Company in 1966.

It is interesting to note that the revised figures of 1963 are much larger than those in the original five year plan which totalled £E 2.166 million as compared to the £E 10.986 million above. The main cause of the increase is to be found in the allocation to Nasr Chemicals company which was originally to require only £E 0.637 million in this five year period, but in fact necessitated an additional £E 5.339 million according to the revised figures for capital investment. The remaining increase in the revised plan is distributed among all the pharmaceutical firms in more or less equal proportions.

The first five year plan (revised) was financed by the Treasury as far as the newly formed Nasr and Nile companies were concerned, whereas established companies (including those amalgamated) paid for their own investment projects. This can be clarified in relation to the following Table which shows investment in 1962/63 and 1963/64 for the nationalised pharmaceutical sector.

Table 32. Investment Expenditure in Public Pharmaceutical Sector, 1962/63 and 1963/64. £E millions

Nasr	Nile	Ein Shams	Arab	Kahira	Alex.	CID	Misr	Memphis	Other	Total
0.637	0.500	0.179	0.060	0.013	0.025	0.231	0.166	0.051	0.200	2.061
0.700	0.650	0.200	0.152	0.400	0.100	0.200	0.099	0.150	0.350	3.000

Source: The Treasury, Op.cit., 30 June 1963. The first row gives the actual investment expenditure in 1962/63 and the second row gives the projected figures for 1963/64. Ein Shams was merged into the Nile company in 1966.

In 1962/63, pharmaceutical firms (all except Nasr and Nile) contributed £E 1.361 million towards total investments of £E 2.061 million and in 1963/64, the same firms allocated £E 2.700 million out of total investment allocations of £E 3 million for the entire public sector. These firms also transferred to GOPCA a large proportion of their annual profits since it is the major shareholder.

But the public sector's internal finances was not sufficient to cover all of GOPCA's obligations[1] in the first years of its operation and it therefore relied to a large extent on external loans and subsidies. The government contribution to GOPCA in loans and grants amounted to £E 3,908,700 and £E 2,899,500 in 1962/63 and 1964/65 respectively.[2]

According to figures published by GOPCA, the total contribution of the government (through the Treasury) to capital investment in the public pharmaceutical sector for the ten year period 1960/61 to 1969/70 was £E 10,616,726.[3]

The following Table gives the annual total investment expenditure of the public pharmaceutical industry for the period 1960/61 to 1970/71.

1. These obligations are discussed in Section 3 of the present Chapter.

2. The Treasury, Op.cit., .

3. Dr. Abd El Halim Haridy, the Economics of Pharmaceutical Industry in the Seventies, pamphlet distributed with the Al-Ahram Economic Monthly, 1st October, 1970, Al Ahram, p.38.

Table 33. Annual Investment Expenditure in Public Pharmaceutical Sector 1960/61 to 1970/71 £E millions

60/61	61/62	62/63	63/64	64/65	65/66	66/67	67/68	68/69	69/70	70/71
0.720	1.743	2.825	3.008	2.130	2.226	1.439	1.003	1.776	1.949	1.555

Source: Statistics Department of GOPCA.

By adding the figures for investment expenditure for the five years 1960/61 to 1964/65 from the Table above, and comparing the total with the projected figure in the revised five year plan in Table 31, it can be observed that actual expenditure on investment was slightly higher at £E.11.425 million than the £E. 10,986 million estimated by the revised five year plan. This implies that GOPCA's investment plans were implemented for the first five year period, 1960/61 to 1964/65. It will also be shown in Section 3 of the present Chapter that all the necessary foreign currency allocations were voted to GOPCA in this period, and it was therefore able to import all the sector's requirements of machinery and raw materials. An assessment of the sector's performance is therefore reliable within this five year period, since no external factors were actively obstructing the execution of plans.

Since 1965/66 and for most of the period until 1970/71, there was a significant change in the ability of GOPCA to obtain foreign exchange from the Treasury, either in sufficient amounts or in the appropriate currencies to enable it to provide the pharmaceutical sector with its production or investment requirements. The severe restrictions imposed by the Treasury on the use of foreign currency in the period 1965/66 to 1970/71 have had little to do with the sector's ability to finance its own growth. In the second five year period, the results of investment made in the first half of the sixties have shown substantial profit margins for the entire production and distribution operations of the public pharmaceutical sector. Whereas GOPCA was a net receiver of

subsidies in the first six years of its operation, the situation has actually been reversed and GOPCA has transferred significantly large net revenues to the Treasury in the late sixties.

The contribution of the public pharmaceutical sector to the national economy can be judged by looking at figures for value added and profits in the late sixties. The following figures include the profitable distribution operations of the two GOPCA companies engaged in the distribution of drugs, pharmaceutical chemicals and medical appliances.

Table 34. Value Added and Profits of the Public Pharmaceutical Sector 1968/69 to 1970/71. £E. millions

Year	1968/69	1969/70	1970/71
Net Value Added	12.924	16.465	20.985
Net Profits before Taxes	6.249	8.516	11.026
Distributed Profits	4.105	7.514	9.129

Source: Final Annual Reports of GOPCA for the three years. All figures based on the annual financial accounts of all firms comprising the public sector: the seven processing firms, Nasr Chemicals, the Packaging Materials Company, the Optical Company and the two distribution companies.

Growth in value added in the three years 1968/69 to 1970/71 is particularly high, but this is partly due to production of the pharmaceutical industry making a fast recovery after the decline it suffered in 1966/67.

As Table 34 shows, the nationalised pharmaceutical sector has achieved very high profits, amounting to more than half of the net value it added to the Egyptian economy in the three year period considered. The figures for Value Added and Profits are net of deprectiation. Distributed Profits are calculated as net profits after the companies have set aside allocations for future growth but before tax payments. Tax payments are calculated on net profits before allocations or distribution (Net Profits after Taxes do not appear in Table 34).

The net contribution of the sector to the Treasury consists of direct taxes on company profits at approximately 30% of profits net of depreciation, plus the share of the State (which is transferred through GOPCA) in profits at 75%. In 1968/69 to 1970/71 the net contribution of the pharmaceutical sector to the Treasury in direct taxes and distributed profits has amounted to three-quarters of 'Net Profits before Taxes'. But the State has also derived indirect revenue from the retail sales of the sector's output by the imposition of sales taxes (Treasury taxes) after 1965. In 1970/71 alone, the nationalised sector has thus contributed £E.8 million to the Treasury in direct taxes and profits, and approximately £E.4 million in Treasury taxes.[1]

For a comparison of value added to production, we have limited our analysis to the manufacturing pharmaceutical firms alone, because available figures give production valued at ex-factory prices, and because this also enables us to relate the figures for 1968/69 - 1970/71 to those for 1960 and 1964/65.

Table 35. Development in Gross Value Added in relation to Production (ex-factory prices) in Manufacturing Pharmaceutical Firms, Public Sector. £E. millions

Year	1960	1964/65	1968/69	1969/70	1970/71
Gross Value Added	1.238	7.050	9.510	12.183	15.116
Production (ex-factory)	3.821	15.881	21.929	27.571	33.052
% GVA to Production	32%	44%	43%	44%	46%

Source: For 1960 and 1964/65 the Central Agency for Public Mobilization and Statistics, op.cit., For 1968/69 to 1970/71, Final Annual Reports of GOPCA.

Notes: In 1960 the industry was not yet nationalised and comprised 41 establishments. In 1964/65 the domestic sector was nationalised and firms were merged into seven processing companies. In 1968/69 to 1970/71, the public manufacturing sector comprises the same seven processing companies plus Nasr Chemicals.

1. Dr. Abdou Sallam, Minister of Health, Cairo, 1971.

Table 35 shows that precentage gross value added to production increased significantly between 1960 at 32% and 1964/65 at 44%. When it is remembered from our earlier analysis that percentage cost of raw materials used in production was identical at 26% in both years, it becomes evident that increased production efficiency cannot account for all of the increase in percentage value added. In Chapter III, page 132, Table 17 was used to compare the cost structure of the industry between 1960 and 1964/65, and it was mentioned that private ownership in 1960 was probably responsible for partly overstating reported costs of production so as to reduce book values of profits and hence taxes. But apart from this qualification, it must be considered that the process of amalgamation between 1960 and 1964/65 might also have resulted in some economies of scale in production. Although it has been emphasized throughout the thesis that the processing of drugs does not involve economies of scale (and the identity of the percentage of raw materials to production in both years confirms this proposition), there are two other important cost factors which do involve economies of scale. These are storage and distribution costs. It is therefore possible that in the process of merging more than twenty small pharmaceutical firms into seven large units, some savings were achieved in these two directions.

The importance of storage in the pharmaceutical industry should be fully appreciated. Pharmaceutical firms rely for their production operations on the availability of stocks of several thousands of different pharmaceutical chemicals, auxilliary chemicals and packaging materials, each in many different stages of processing. The wide range of finished drugs must again be stored in different dosage forms under special conditions. This fact can be illustrated by comparing the percentage value of inventories of finished stocks and raw materials to capital employed between the pharmaceutical sector and the whole

chemical industry (which includes pharmaceuticals) in Egypt. The aggregate balance sheet for the pharmaceutical industry shows that the percentage value of inventories to capital employed stands at 68%, as opposed to 19% in the aggregate balance sheet of the chemicals industry.[1] In relation to fixed assets, stocks of finished output and raw materials are again very much higher in the pharmaceutical industry than in the chemical industry, or than in the manufacturing industry as a whole. The ratio of inventories to fixed assets is 1.53 : 1 in the pharmaceutical industry, 0.34 : 1 in the chemical industry, and 0.58 : 1 in the manufacturing industry as a whole.

The costs of maintaining and transporting such large stocks of materials, finished and semi-finished products must therefore obviously account for a high proportion of the firm's total costs, especially when it is remembered that manufacturing proper accounts for a relatively small percentage of total costs in the pharmaceutical industry.

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1. The aggregate balance sheets of the pharmaceutical industry and the chemicals industry can be found in the Central Agency for Public Mobilisation and Statistics, National Economic Indices, Part I, Financial Indices for Public Sector Companies (except Banks and Insurance Companies) for 1966/67. Publication No. (711-01), Cairo, December 1969, pp.54, 80, 100, 126.

In comparison to other manufacturing industries in Egypt, the nationalised pharmaceutical industry has again exhibited a very high performance. The Central Agency for Public Mobilisation and Statistics has begun to publish in 1969 aggregate financial data on the operation of each nationalised industry, obtained by adding the individual figures from the annual financial accounts of every company belonging to the public sector. The first section of this publication gives the aggregate detailed financial accounts of all industries, classified according to the type of economic activity they engage in. There are eight broad sectors: extractive, manufacturing (subdivided as in Table 36), transport, commerce, services etc... The second section gives aggregate detailed financial accounts of each group of companies belonging to an independent General Organisation - There are 39 General Organisations: army factories, petroleum, cotton, spinning and weaving, chemicals (does not include pharmaceuticals), pharmaceuticals, etc.... - Complete details of an industry's assets, debits, manufacturing and other costs, profits and losses, can be found in 42 separate Tables, each showing details of five different financial accounts.

We have tabulated below some figures taken from the aggregate accounts of the nine major manufacturing industries as well as total manufacturing, for comparison with the pharmaceutical industry. We have then calculated (Table 37) turnover to capital, sales and capital per worker and return on capital, as basic indicators of the financial results of the different industries in 1966/67, the first year whose figures were published by the Central Agency for Public Mobilisation and Statistics. The nine industries in Table 36 and Table 37 accounted for 88% of total sales of all manufacturing industry under public control in that year. The pharmaceutical industry is included in the

chemical industry according to this classification. We have then entered at the bottom of Tables 36 and 37 the separate figures pertaining to the pharmaceutical industry alone, as given in the second section of the publication, where the individual groups of companies are grouped according to the General Organisation supervising their operation.

Table 36. Sales, Capital Employed, Labour Employed and Gross Profits in Egyptian Manufacturing Industry 1966/67. Values in £E millions

Industry	Sales	Capital Employed	Labour Employed	Gross Profits
Food Products	107.393	86.067	49,336	8.012
Tobacco	120.487	45.475	11,245	9.913
Spinning and Weaving	209.817	326.424	190,877	41.810
Chemicals	110.219	217.135	46,080	25.473
Petroleum and Coal Products	14.994	89.938	10,375	10.207
Basic Metals	43.251	113.628	24,098	3.867
Electrical Equipment	25.107	46.048	13,959	6.738
Transport Equipment	24.760	45.635	13,987	4.652
Total Manufacturing	748.454	1176.641	432,069	126.268
Pharmaceuticals	46.865	37.927	14,128	7.192

Source: The Central Agency for Public Mobilisation and Statistics, National Economic Indices, Part I, Financial Indices for Public Sector Companies (except Banks and Insurance Companies) for 1966/67. Publication No.(711-01), Cairo, Dec. 1969.

Notes: Capital Employed is calculated from figures taken from the debit side of the balance sheet of each industry and is defined as the sum of : paid up capital, reserves (except for reserves used in the purchase of government bonds), undistributed profits, provisions, long-term loans and accumulated depreciation. Gross profits is calculated from figures taken from the profit and loss account, the distribution account, the manufacturing account, and the trading account. Gross Profits is defined as the sum of: net distributed profits, total annual depreciation, annual interest payments, and annual allocations (provisions).

Table 36 shows that the Egyptian pharmaceutical industry accounts for 17.5% of total capital employed in the chemical industry, 30% of the total labour it employs, and 42.7% of its total sales. These percentages exemplify the statement made in Chapter I that in most

developing countries which have made a start in industrialisation, the production of pharmaceuticals accounts for a relatively large percentage of the chemical industry's output than in developed countries where the percentage is 10% on average. The above figures also correspond to the general observation that the development of a pharmaceutical industry requires relatively small investments in capital. As can be seen from Table 37, the capital to labour ratio in the pharmaceutical industry is 2.69 in contrast to 4.61 in the chemical industry.

Table 37. Average Sales and Capital per Worker Employed, Turnover and Profit percent. Capital Employed in Egyptian Manufacturing Industry 1966/67

Industry	Sales per Worker £E.	Capital per Worker £E.	Turnover to Capital %	Profit percent Capital
Food Products	2,177	1.74	125%	9.2%
Tobacco	10,715	4.04	265%	21.3%
Spinning and Weaving	1,099	1.71	64%	12.8%
Chemicals	2,341	4.61	51%	12.3%
Petroleum and Coal Products	1,445	8.67	17%	11.9%
Basic Metals	1,795	4.72	38%	3.0%
Electrical Equipment	1,799	3.30	55%	14.2%
Transport Equipment	1,770	3.26	54%	9.7%
Total Manufacturing	1,732	2.72	64%	11.4%
Pharmaceuticals	3,317	2.69	124%	18.2%

Source: The Central Agency for Public Mobilisation and Statistics, National Economic Indices, Part I, Financial Indices for Public Sector companies (except Banks and Insurance Companies) for 1966/67. Publication No.(711-01), Cairo, Dec. 1969.

Figures for the value of output of the different industries are not given in the source we have used for the above Tables, but we have found that the value of sales are a good approximation to output because changes in inventories (which could be calculated from the financial accounts) were not a significant percentage of sales for any

industry considered.[1] It is therefore possible to judge productivity of capital and labour in terms of sales as an indication of the relative performance of the different manufacturing industries.

Both turnover to capital (sales divided by capital employed) and sales per worker in the pharmaceutical industry are very much higher than the manufacturing industry average. Turnover to capital is 124% for the pharmaceutical industry as opposed to 64% for all manufacturing and 51% for the chemical industry. Sales per worker are £E.3,317 for the pharmaceutical industry as opposed to £E.1,732 for all manufacturing and £E.2,341 for the chemical industry. This implies that the average productivity of both capital and labour are relatively high in the pharmaceutical industry.

Gross value added in production of the pharmaceutical industry is comparatively high at more than 40% in the mid-sixties, a rate which is probably very near to that prevailing in the chemical industry and much higher than that in the food industries or in spinning and weaving.[2]

In terms of profitability, Table 37 shows that return on capital in the pharmaceutical industry is second only to the rate achieved in tobacco manufacture. The prices at which the pharmaceutical industry sells its output is currently regulated by the government through GOPCA. Although Section 2 of the present Chapter is devoted to a detailed analysis of the price structure for drugs in Egypt, it can be stated here that prices of Egyptian drugs are generally very competitive with international prices. If one also adds the consideration that the pharmaceutical industry as a whole is no longer subsidised (not since the mid-sixties) it is then fair to conclude that the performance of the pharmaceutical industry has been most impressive.

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1. It is interesting to note that changes in inventories (defined as end of year inventories minus start of year inventories) were all negative, implying a possible reduction in output as a result of the June war in 1967.

2. See Bent Hansen and Girgis A. Marzouk, Development and Economic Policy in the UAR (Egypt). North Holland Publishing Company, Amsterdam, 1965. p.121, Table 5.4

Indices of growth in production, value added and profitability have shown considerable progress and success for the public pharmaceutical sector as a whole over the period 1960 to 1971 but this success has not been shared by all companies in the nationalised industry. Whereas all seven secondary manufacturing firms which account for 89% of total output in 1970/71 have shown continued profitability, the primary producing company, Nasr Chemicals, has proved to be a heavy loser for most of the period, as will be detailed in Section 4 of the present Chapter.

In order to assess the performance of the seven nationalised pharmaceutical companies over the twelve year period 1960-71, we have chosen as basic indicators values for production, value added and profits in relation to capital and labour employed.

The source of our data for the period 1960-1971 is the complete annual accounts of the firms from 1965/66 to 1970/71, the census of the industry made by the Central Agency for Public Mobilisation and Statistics for 1960, 1964/65 and 1965/66, and the studies and reports prepared by GOPCA.

The level of disaggregation of the figures is surprisingly high, allowing one to calculate the necessary measures with a high degree of accuracy. In 1967, accounting methods were standardised for all industry, to facilitate the work of the Central Agency for Public Mobilisation and Statistics and its census taking, and accounts have since been disaggregated even further and follow a classification according to stages of production in manufacturing. For instance, to obtain a figure for total annual depreciation or wage payments, one must add the separate entries in four different accounts - one for manufacturing, one for manufacturing services, one for distribution and one for administration and finance.

Capital Employed by the company is defined as the sum of its long term liabilities:

- paid up capital,
- total reserves except those used to buy government bonds (and cannot therefore be considered part of capital employed).
- total allocations (or "provisions") except allocations for disputed taxes (which are a short term liability),
- long term loans. Capital employed is therefore gross of depreciation.

Gross Profit is defined as total profits after the payment of administration expenses but before the payment of interest, depreciation or taxes. We have also included in our calculation of gross profits annual allocations ('provisions') which have not been currently spent, because net profits in the books of all firms are net of substantial allocations to different funds for growth, an intersting indication of the wish of their Board of Directors to distribute less total profit, (these unspent allocations are of course included in the calculation of profit for tax purposes).

Gross Value Added is obtained by subtracting from production at ex-factory prices the value of products and services purchased from outside the firm. The distribution of value added is such that the shares going to capital, and to land and buildings are adjusted by imputing values for interest and rent on owned capital and buildings. The standard rate for imputed interest payments is 4% of owned capital and imputed rent is 7% of the value of owned land and buildings. Owned land and buildings are valued at ten times their rateable value.[1]

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1. Central Agency for Public Mobilisation and Statistics, The Pharmaceutical Industry, Publication No.(319-10), December 1967, p.335.

Table 38. Development in Production, Value Added, Capital Employed, and Labour Employed for the Seven Nationalised Pharmaceutical Firms

Year	Production ex-factory prices £Emil.	Index	Value Added (Gross) £Emil.	Index	Capital Employ.(Gross) £Emil.	Index	Labour Employ. Thousand	Ind.	Gross Profits £Emil.	Index
1960	3.772	100	1.238	100	3.217	100	3.329	100	0.578	100
62/63	8.200	217			6.000		4.463*			
63/64	11.200	296								
64/65	14.378	381	7.050	569	12.640	392	7.236	217	5.169	894
65/66	20.750	550			16.800	522			5.830	1005
66/67	17.860	473			20.067	623			5.503	952
67/68	19.070	505			21.420	665	8.205	246	5.460	945
68/69	20.856	552	9.085	733	23.210	721	8.418	252	6.221	1076
69/70	25.248	669	10.964	885	24.520	762	9.674	290	7.246	1254
70/71	29.443	780	13.513	1091	26.750	831	10.064	302	9.079	1571

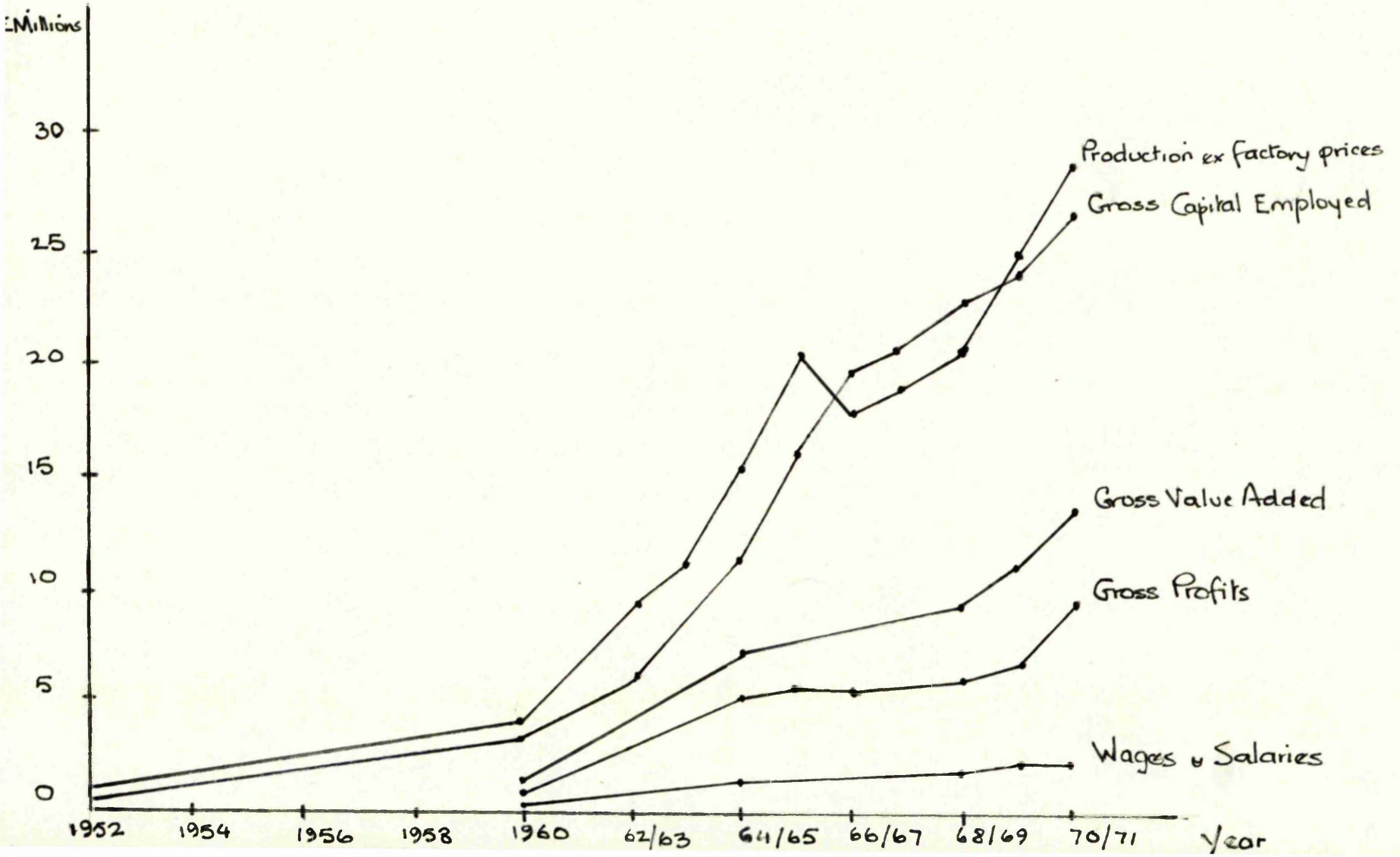
Source: Annual financial accounts of seven companies Central Agency for Public Mobilisation and Statistics and Final Annual Reports of GOPCA.

* Figure for labour employed does not include Ein Shams Company in 1962/63.

Table 38 and the graph (see p.182) show that output of the processing firms rose very steeply between 1960 and 1965/66, together with investment (capital employed) in the industry. Whereas capital employed rose by 422%, the production index shows an increase of 450% over the five year period. After 1965/66, the process of capital accumulation continued, although growth in investment was much slower; whereas production dropped in 1966/67 and only regained its 1965/66 level three years later, in 1968/69.

From 1968/69 to 1970/71, production again rose by 40% over the two years, while capital employed rose by 15%. Changes in investment can therefore be seen to have been much more gradual, and are probably much less sensitive to external influences (shortages of foreign currency to the industry) than changes in output. Production of the

Graph to Table 38



pharmaceutical firms has suffered over all of the second half of the sixties from raw material shortages, and a significant percentage of production capacity has remained idle over this period, as reports of the firms and GOPCA confirm.

Over the whole twelve year period considered, capital employed by the seven firms has risen at a much faster rate than labour employed. This implies that the manufacturing process has become more capital intensive,[1] either because the production function in processing pharmaceuticals is such that increased output requires relatively small increases in labour than capital inputs, or because manufacturing firms have deliberately selected more capital intensive production techniques over time. The first explanation does not seem to be important in the context of the pharmaceutical industry, judging from our description of the processing techniques involved.[2] But the second explanation can be verified in Egypt as well as many advanced countries. In the industrialised world, the process of substituting capital for labour has been taking place in most of the OECD countries.[3]

In Egypt, after nationalisation, many production processes which were carried out manually have been replaced by machines. This is especially true in the processing of ampoules and capsules and in the packaging of most dosage forms. The process of automation has been greatly encouraged by the closer association which has developed between local firms and their foreign licensors whose production techniques have been largely adopted by Egyptian firms. But what has probably accounted for the major increase in capital employed by local firms

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1. Unless of course increases in capital accumulation, which are financed internally by the companies' undistributed profits, have not been fully utilized in the purchase of capital goods. This possibility is excluded by looking at figures in Table 41.

2. See Chapter I, Section 2.

3. OECD, Gaps in Technology : Pharmaceuticals, Op.cit., p.59.

is the setting up of entirely new and highly sophisticated quality control and research units. According to GOPCA these departments were of acceptable standard at only two of the private companies before nationalisation.

Egyptian pharmaceutical companies have also entered into new fields of production which did not exist before nationalisation and which have required increasingly expensive manufacturing installations and equipment. Examples are the manufacture of parenteral solutions at Nile company and the production of hormones at CID company.

To judge the development in productivity of labour or capital using production figures alone would conceal the extent to which backward integration within processing firms has increased over the period. It will be recalled from Chapter II that most pharmaceutical firms in the 1950s were engaged in very limited processing activities. As an extreme example, more than 70% of CID's operations were shown to be concentrated on the packaging of imported finished drugs in their bulk form.

We have therefore calculated in Table 39 the productivity of labour and capital both in terms of output and in terms of value added.

Average output per worker has increased from £E.1,130 in 1960, to £E.2,920 in 1970/71, an increase of 175% over the period. Output producitivity of capital has fallen over the same period by 6%. The rise in productivity of labour is to be expected as a natural arithmetical consequence of the large increase in capital intensity. But these measures of labour and capital productivity have concealed the great increase in percentage value added in production. If we therefore measure productivities in terms of value added, it can be shown that backward integration has taken place in the processing of drugs.

Table 39. Development in Capital Intensity, Productivity of Capital and of Labour in the Seven Public Firms. Values in £E.

Measure	Definition	1960	1964/65	1968/69	1969/70	1970/71
Capital Intensity	$\frac{\text{Capital Employed}}{\text{Labour Employed}}$	960	1,740	2,750	2,530	2,650
Output Productivity of Labour	$\frac{\text{Production ex-factory}}{\text{Labour Employed}}$	1,130	1,980	2,470	2,600	2,920
Value-added Productivity of Labour	$\frac{\text{Gross Value Added}}{\text{Labour Employed}}$	370	970	1,070	1,130	1,340
Output Productivity of Capital	$\frac{\text{Production ex-factory}}{\text{Capital Employed}}$	1.17	1.13	0.89	1.02	1.10
Value-added Productivity of Capital	$\frac{\text{Gross Value added}}{\text{Capital Employed}}$	0.38	0.55	0.39	0.44	0.50

Source: Calculations made using figures in Central Agency of Public Mobilisation and Statistics, The Pharmaceutical Industry, Op.cit., and Final Annual Reports of GOPCA.

Value added productivity of labour has risen by 260% over the period 1960 to 1970/71, while value-added productivity of capital has risen by 31%. The fact that the rates of increase in value-added productivity are higher than the rates of increase in output productivity for both labour and capital points to an important increase in backward integration. Moreover, the fact that value-added productivity of capital has risen at the same time as the productivity of labour in spite of the capital labour ratio having more than doubled over the period is an obvio us indication that production efficiency is greatly increased.

A closer look at the development of value-added productivity of capital in Table 39 shows that it attained its peak in 1964/65 at £E 0.55 (after which it fell together with production in 1965/66). Until 1970/71, value-added productivity has not regained its maximum level of 1964/65. This confirms the proposition that the pharmaceutical industry has a significant potential for production which is not being utilised.

Growth in value added has outpaced the growth of production, capital employed or labour employed. It can also be seen from Table 38 that the share in value added going to profits has increased at the expense of the shares paid out in wages and salaries; whereas gross value added increased by 991% over the period 1960 to 1970/71, gross profits increased by 1471% over the same period. Wages and salaries rose from £E 0.58 million in 1960 to £E 3.5 million in 1970/71, an increase of 500% over the period. But it must be remembered that workers and employees receive 25% of the net distributed profits of the firms, although only 10% rather than the full 25% are paid out in cash, with a maximum annual payment of £E 50 to each employee.

Table 40 gives return on capital at the level of each of the seven processing firms and shows that high profitability is a feature shared by all firms alike.

The decline in production in 1966/67 and 1967/68 has had a direct effect on the profitability of the seven firms in these same two years. Average return on capital fell from 35% in 1965/66 to 27% in 1966/67 and 25% in 1967/68.

Table 40. Return on Capital Employed for the Seven Public Firms

Firm	1965/66	1966/67	1967/68	1968/69	1969/70	1970/71
Nile	20%	12%	14%	16%	19%	23%
Arab	n.a.	n.a.	21%	23%	26%	30%
CID	44%	29%	28%	25%	27%	34%
Kahira	n.a.	30%	31%	38%	41%	40%
Alex	32%	31%	31%	28%	42%	51%
Memphis	50%	39%	38%	39%	36%	40%
Misr	n.a.	35%	28%	28%	30%	35%
Average	35%	27%	25%	30%	30%	35%

Source: Annual financial accounts of the seven firms. Return on Capital employed is defined as the percentage of gross profits to gross capital employed.

To test the proposition that firms have actually utilized this large increase in capital accumulation in investment in productive capacity rather than liquid assets or inventories, we have calculated for seven years the percentage of fixed assets and projects under construction (on the asset side of the aggregate balance sheets of the seven firms) to total capital employed (gross of depreciation).

Table 41. Fixed Assets as Percentage of Capital Employed for the Seven Public Firms

Year	1960/61	1964/65	1966/67	1967/68	1968/69	1969/70	1970/71
Percentage	31%	32%	35%	39%	39%	40%	41%

Source: Annual financial accounts of seven public firms. 1960/61 figures relate to the forty-one concerns which existed before nationalisation.

Table 41 shows that the percentage of fixed assets (and projects under construction) in capital employed has increased over the period, implying a better utilisation of accumulated profits. Productive capacity in the form of fixed assets has grown even faster than capital employed and has therefore contributed to the percentage growth of value added to capital employed.

2. Price Control in the Pharmaceutical Industry

Throughout Section 1 in which we dealt with the development of the industry, we did not include any particular reference to prices. The use of a price index as a deflator has been unnecessary in the accepted sense because prices of domestically produced drugs in Egypt have been fixed since 1961, the last date when they underwent some change in a downward direction.

However, we are now going to concentrate more closely on prices because of the degree to which they limit the ability of firms to operate with a reasonable amount of independence and because of the extent to which indices of output and profitability are affected by prices.

Until 1959, there had been no price control on domestically produced drugs, although imported drugs had been subject to an element of control since 1952 by the reduction and fixing of the maximum profit margin allowed on their FOB cost. But this measure was soon found to be ineffective, as described in Chapter II, because it was exercised at the distribution level only and therefore had no influence on import prices which began to rise subsequently.[1]

As long as government control of the pharmaceutical market was absent, domestic drug prices were determined according to competitive conditions. The price structure of domestically produced drugs followed the international structure very closely since foreign drugs dominated 90% of the market. But across the entire range of products, domestic producers generally offered their products at prices well below those of their foreign substitutes in order to be able to compete with the well-established multinationals whose brands were generally accepted as superior.

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1. Effective control of foreign drug prices was introduced in 1960, when the Higher Organisation for Drugs was assigned the role of sole importer and distributor of foreign drugs in Egypt. See Chapter II, Section 2.

As explained in Chapter I, the pricing of newly discovered drugs bears little relationship to their cost of manufacture, while older drugs have normally been reduced in price together with the reduction in the degree of monopoly governing their production and sale. This meant that foreign prices for modern drugs allowed domestic producers relatively higher percentage mark-ups on cost than those preparations which had been on the market longer.

In 1959, the Ministry for Industry made a study of domestic drug prices in relation to cost of manufacturing of domestic firms, in order to establish the first set of tariffs for domestic drugs on the market. This study was made without consulting the Higher Organisation for Drugs or the producing firms, but with the use of data provided by those firms in their annual financial accounts for the year 1957/58. The Ministry fixed the price of each drug by adding a number of standard cumulative percentage allowances on its direct manufacturing cost (cost of raw materials plus direct wages).[1] These allowances or cumulative percentages were supposedly calculated on the basis of the overall cost structure of the firms studied, but as can be seen from the Table below they were arbitrarily chosen. Four out of the five percentages allowed can be seen to stand at an identical 25% of the cumulative figure for total cost.

Although the tariff basis implied a cost structure which was far from real, it made a very generous total allowance for expenditures other than direct manufacturing costs incurred by pharmaceutical firms, allowing an average mark-up on costs of 200% as can be seen from Table 42.

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1. The idea of using cumulative percentages is itself nonsensical, and there is no reason to expect any kind of relationship between direct manufacturing costs and sales and distribution expenses, administration costs, or free samples.

Table 42. First Basis Used for Tariffication of Domestic Drugs

Type of Expenditure	Cumulative on-cost Allowance	Cumulative Total Expenditure	Cost Structure Implied	
Direct Manufacturing Cost	-	100	100	34%
Cost of Free Samples	20%	120	20	7%
Other Industrial Costs	25%	150	30	10%
Administrative Expenses	25%	187.5	37.5	13%
Sales and Distribution Costs	25%	234.4	46.9	16%
Profit	25%	293.0	58.6	20%
Value of Sales		293.0	293.0	100%

Source: Mohamed Abd El Moneim Said, Problems in the Measurement of Costs for the Purpose of Tariffication in the Pharmaceutical Industry, project presented for diploma in Costing, Cairo University, 1964, p.76.

But the problem that occurred when applying the established percentages to individual drugs was that price adjustments were necessary in both the upward and downward direction. The Ministry faced a situation which agrees very closely with our analysis of price determination in a free market for drugs. Prices of all those drugs which were relatively old on the market, such as penicillin, streptomycin, insulin and some of the vitamins, were priced below the estimated price which would have been allowed by using the full on-cost allowance, while drugs in relatively modern groups such as tranquilisers and antihistaminics were priced above the estimated price using the standard allowances.

Because of the medical importance attached to the older group of drugs which were priced very near to cost, the Ministry decided that it would not allow the domestic firms to raise these prices (and these firms would have found it impossible to do so in any case, without losing their competitive position vis-à-vis foreign brands). But the Ministry still imposed the full reduction in price on all those drugs which were higher priced than allowed by the cost standard.

This measure was to put many local companies in a very difficult position in terms of their profitability. For instance, 34 of the products sold by CID had to be reduced in price by varying percentages. Those products which were to undergo large changes in price were obviously those on which CID was realizing the largest mark-ups, allowed for by the high international prices for drugs such as tranquilizers, eye and nose drops, cough syrups. Although the price reductions imposed on most products were small percentages, the total result would have seriously affected the profit position of CID who had only achieved a rate of profits before taxes of 9.3% of sales for the fiscal year 1957/58.

The Chairman of the Board of Directors of CID immediately brought forward a detailed memorandum on behalf of his Company and of the entire group of local companies which would have been affected by the newly announced tariff.[1] Two studies were included to show the effect of applying the tariff on CID's financial results, one for the year ended 1957/58 and the second for the estimated results of CID's operations in 1958/59. The effect of the tariff would have been a reduction in the value of sales for 1957/58 of £E 22,071 or a fall in profits percent sales from 9.3% to 4.6%. According to the sales volume estimated for 1958/59, applying the tariff would have meant a net loss over sales of 8%, due to a fall in the value of sales equal to £E 42,621. The second study also showed that if the basis of the tariff were applied to all CID products, allowing for price increases as well as the imposed reductions, the estimated value of sales would rise by £E 118,053 instead of falling by £E 42,621.

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1. Dr. Abdou M. Sallam, Chairman of Board of Directors of CID, Memorandum on the Tariffication of Domestic Drugs and its Effect on CID Company, 30 March 1959.

CID raised two main objections to the principles applied in establishing the first tariff. On the one hand, the fixing of prices of local drugs when similar control for imported drugs was non-existent meant that price differentials between foreign and local brands would become even higher than before tariffication. According to CID, this would cause a deterioration in its competitive position as far as chemist sales were concerned, since the profit made on low priced local brands would become so small that chemists would be encouraged to only sell foreign brands at the expense of their local equivalent. Two striking examples[1] of the new price differential between CID products and their foreign equivalents were used to demonstrate the effect of the new tariff:

	Wholesale Profit Margin	Chemist Profit Margin
"Metonal" (CID)	22 milliemes[2]	73 milliemes
"Litrison" (Roche equivalent)	82 milliemes	225 milliemes
"Toloxan" (CID)	5 milliemes	20 milliemes
"Antistin" (CIBA equivalent)	22 milliemes	60 milliemes

CID also maintained that the increased price differentials between local and foreign brands would cause the loss of confidence of the public for the quality of the local brand. With the foreign brand "Antistin" for instance, retail price to the public was fixed at 38 piastres[3] for a 10 cc bottle, while the Ministry for Industry was now imposing a reduction on "Toloxan" (15 cc bottle) from CID's price of 15 piastres to 9 piastres. The public could hardly be expected to believe that the local brand contained the same type and quality of ingredients as the foreign brand when the price of the first was less than half and contained $1\frac{1}{2}$ times as much of the medicament.

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1. Ibid., p.18.
2. One Egyptian pound, £E = 1000 milliemes.
3. One Egyptian pound, £E = 100 piastres.

In relation to competition between local manufacturers themselves, CID criticized the effect of the new tariff as being discriminatory. The Ministry had chosen to scrutinize and fix the prices of only the largest nine local pharmaceutical companies, while the small laboratories were left free to determine the price of their own products. For those companies whose prices were fixed, the tariff basis was discriminatory against the firms who were more efficient in keeping down their costs of production (either by finding cheaper sources for their raw materials or by having lower wage costs). One local company, for instance, "Ama" was allowed to charge much higher prices than CID for two products, Insulin and Penicillin, on account of its higher manufacturing costs in their production (both CID and Ama were producing these drugs under license from foreign manufacturers). As a result of the complaints made by CID and other local companies, the tariff on some products were readjusted upwards to a compromise level between their original price and the first tariff imposed.

The most valuable lesson to be drawn from the industry's experience with the first tariff is that to price drugs using the cost standard alone is bound to run into difficulties on account of the international price structure which is far from competitive. In a relatively free market, domestic producers are forced to price their drugs in the same way as international firms which dominate the market. These firms use price discrimination in two directions. Within the total range of products sold, some products are sold at prices far above their average cost levels, and the profit margins on these drugs contribute the major share of the firm's overheads, distribution and selling costs. Other products are sold at prices very near to marginal cost, for reasons of competition, prestige gained in offering essential drugs at low costs and because this policy limits the entry of small competitive producers to those markets with easy access in terms of

technology and raw materials availability. Price discrimination is also used in the sale of the same product to different consumers. Many Egyptian firms explained that until the late fifties they were seldom able to sell products to the Ministry of Health because of the policy of the multinationals which were often bidding for those tenders at prices below raw material costs.

When GOPCA took over the control of domestic firms in 1961-63, it was also made responsible for establishing a pricing policy for locally produced drugs. GOPCA decided to apply two rules for fixing the price of local drugs. The first was the international price standard. No local drug would be allowed to be priced above the price of its equivalent on the international market, as judged by the quotations received by GOPCA in importing. The second standard used to price drugs was to become the therapeutic value of the drug. For all those groups which were deemed as essential (antibiotics, contraceptive pills, antidiabetic drugs), prices would have to be very near to cost, whereas prices of inessential groups such as analgesics, tranquilizers, vitamins and tonics could include an allowance for relatively higher profit margins.

The prices of imported drugs had somewhat fallen in 1960, following government control over the purchase of foreign drugs, and these prices were further reduced by 25% at the end of 1960. This meant that GOPCA's price review of domestically produced drugs after 1960 dictated some reductions in their prices to conform to the new rules. The prices of several local brands were therefore reduced by rates ranging between 20% and 60%. After this period, ex-factory prices have remained fixed. But new drugs are constantly being produced by local firms and prices suggested by producing firms are therefore reviewed by GOPCA for approval.

The prices of all new drugs produced are carefully studied in relation to their imported equivalents[1] so as to set the upper limits on what local firms are allowed to charge. A comparison with manufacturing cost is then used to calculate a profit margin in relation to the medical importance of the drug on the market.

In this new centrally controlled price structure, it is evident that the product mix chosen by any single firm will directly affect its overall profitability. This is why GOPCA had to be very careful when it applied its production policy - which aimed at introducing specialisation within the group of seven firms - not to restrict any one company to the production of the less profitable group of drugs. Of course price discrimination between drugs is also exercised within a particular therapeutic group. With antibiotics for instance, the more commonly used and older preparations will allow a much smaller profit margin than the newer preparations, because the international price standard will dictate this kind of cost structure for any particular group of drugs. CID supplies the Egyptian market with approximately 40% of its requirement of antibiotics, and the following Table describes the relationship between manufacturing costs and ex-factory prices on some of the preparations sold.

The pricing policy of GOPCA also allows for price discrimination for the same drug between different buyers, in accordance with the pricing policy of multinational firms. Sales to bulk purchasers (government agencies, the armed forces, and insurance organisations) are thus priced at only a fraction of the fixed prices charged to the retail consumer. This can be clearly shown by comparing the percentage mark-up on sales realised by CID in the second half of 1963.

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1. Imported equivalents continue to be available on the market for a period of two years to enable the public to learn of the existence of local brands.

Table 43. Mark-up on Sales of Different Antibiotics Preparations in the Egyptian Market. Value in Piastres*

Generic Name	Brand Name	Manufacturers	Manufacturing Cost	Retail Price	Percent Mark-up
Penicillin Procaine 400,000 U	Penicillin Procaine 1 vial	CID	1.38	2.70	48%
Penicillin Procaine + Benzyl 400,000 U	Penicid 1 vial	CID	3.52	5.00	33%
Streptomycin	Streptomycin 1 vial	CID	3.77	6.50	41%
Chloramphenicol 250 mg, 12 capsules	Cidocetine	CID		40.00	
	Memcocetin	Memphis	21.2	35.0	40%
	Veracetin	Nile	18.6	42.00	55%
	Chloromycetin	Parke-Davis		75.0	
Tetracyclin HCL + Oleandomycin 250 mg, 16 capsules	Sigmacid	CID	61.9	140.0	66%
	Sigmamycin	Pfizer/ Egypt	85.3	179.0	
Oxytetracyclin HCL 250 mg 16 capsules	Oxytetracid	CID	24.6	90.0	72%
	Oxytetrin	Memphis	18.7	65.0	71%
	Terramycin	Pfizer/ Egypt		191.0	
Tetracyclin HCL 250 mg, 16 capsules	Tetracid	CID	15.6	65.0	75%
	Tetracyclin HCL	Bayer		142.0	

Source: Pricing Department of GOPCA. Manufacturing cost includes raw materials, packaging materials and industrial costs. Percent Mark-up is calculated as the difference between retail price and manufacturing cost, percent retail price.

* One Egyptian Pound, LE = 100 piastres.

Table 44. Mark-up on CID Sales to Different Purchasing Sectors for the period from 1.7.1963. to 30.12.1963. Value of Sales in £E thousands

Dosage Form	Retail Sector		Government Sector	
	Value of Sales	% Mark-up	Value of Sales	% Mark-up
Antibiotics*	241	58.6%	172	24.1%
Tablets	268	61.8%	46	17.7%
Syrups	161	65.6%	3	60.9%
Ointments	9	52.6%	0.4	43.9%
Ampoules and solutions	138	59.2%	2	48.5%
Extracts	7	25.9%	11	29.1%
Tartar Emetic	-	-	2	50.2%
Capsules	30	69.5%	2	27.3%
Total	834	61.0%	243	23.5%

Source: Mohammed Abd El Moneim Said, Op.cit., p.58.
% Mark-up is defined as the difference between direct manufacturing costs and sales valued at ex-factory prices, percent sales (valued at ex-factory prices). Tartar emetic is an antibilharzia drug.

* Antibiotics are not groupsed according to their dosage form because of their critical importance to the firm which leads them to be classed separately (antibiotics are sold mainly as vials, ampoules or capsules).

During the three years, 1961/62, to 1963/64, the nationalised pharmaceutical firms introduced 137 new preparations in the market. Of this total number, 107 preparations were identical equivalents to imported drugs which still existed on the market, when the local brands appeared. It is therefore possible to verify that GOPCA's pricing policy was enforced and all domestic drugs can be checked to have been priced below their foreign equivalents, with price differentials ranging from under 10% to over 50%.[1] Of the total 107 preparations for which we could directly compare prices, 18 domestic brands were priced less than 10% below the price of the foreign brand, 22 domestic brands

1. Price information was obtained from GOPCA's Department of Statistics which also has complete records of the new entries of domestically produced drugs each year, their generic composition, and the names of the foreign brands which are being replaced.

were priced between 10% and 30% below the price of the foreign equivalent, and 64 domestic brands were priced at more than 30% below the price of their foreign equivalent. Only three preparations were priced at exactly the same level as the foreign equivalent.

When measuring the volume of domestic production of drugs in terms of the value of output over time, one can safely say that the ex-factory price level for all existing drugs has remained fixed for the period 1960 to 1970/71, even though sales taxes (Treasury taxes) were imposed on the retail price of most drugs after 1965/66 at an average of 10% over their existing levels. But it must be remembered that the general price level for all drugs including new entries will tend to rise over time, in line with rises in the general international price level[1] for drugs. The effect of such price increases in the Egyptian market will be a tendency to overestimate real increases in volume when measured by increases in value of output. But this overestimate is certainly more than compensated for by an opposite trend which has taken place over the period 1960-1970/71. As illustrated in Table 5 of Chapter I (page 16) the percentage share of government institution purchases in total expenditure on drugs has grown significantly over time, and we have just observed that the prices at which firms sell their output to government institutions is approximately one-third of the ex-factory prices charged to wholesalers. The overall result of the two trends described is therefore that the index of production valued at ex-factory prices has slightly underestimated the true indix of volume of production of drugs. The following Table compares the actual value of sales of the seven nationalised firms to the public sector (all government institutions) with the estimated value which would obtain if such sales were priced at the same ex-factory prices charged to wholesalers.

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1. The international price level of new drugs within any given therapeutic group can be observed to be higher than the price level of existing and older preparations in that group (see Chapter I).

Table 45. Sales to Government Institutions Valued at Actual Prices and Wholesale Prices, 1962/63 to 1968/69, Values in £E millions

Year	62/63	63/64	64/65	65/66	66/67	67/68	68/69
Actual Sales Value	1.4	1.7	2.4	3.5	3.5	4.5	4.9
Estimated Sales Value (Wholesale Prices)	2.3	2.8	4.0	5.8	5.8	7.5	8.2

Source: GOPCA annual report for 1969, p.58.

3. The Role of GOPCA

The success achieved by the Egyptian pharmaceutical industry since nationalisation can be directly attributed to the role played by GOPCA. This central supervisory body has been actively concerned with every aspect of the industry's operation throughout the 1960s, with the mammoth task of reorganising production, distribution and imports.

GOPCA planned and supervised the merging of small firms into larger units, the capital investments in new production installations, the patent and know-how agreements between foreign and local firms, the import of machinery and raw materials, and the control of domestic drug prices. The result was a remarkable performance in the first five years 1960-65, with considerable increases in output, productivity, and profits. The seven processing firms were thus able to contribute large amounts of net revenue to GOPCA, which, together with Treasury grants in this five year period enabled GOPCA to finance many expensive obligations.

When the Higher Organisation for Drugs (later to become GOPCA) took over the distribution function from private importers and wholesalers, considerable reorganisation and rationalisation was necessary. The number of employees required fell from 2,500 to 1,800, but wages had

to be paid to all the surplus staff until they could be transferred to new jobs in the industry. This was achieved by 1963, and wage payments fell as a result from £E 60,000 per month to £E 25,000 per month.[1] Whereas importing agents and wholesalers had been allowed approximately 30% profit margins on the CIF cost of imported drugs, GOPCA was operating on an average 5% margin on the retail price of both domestic and foreign drugs. Moreover, GOPCA had to absorb the difference between the new retail price for foreign drugs (which were reduced by 25% in 1960) and the purchase price at which it was buying these drugs on the international market. This proved very costly for some time until GOPCA was able to obtain lower prices from multinational firms by setting tenders and seeking competitive levels for its bulk purchases.

GOPCA was also assigned the task of setting up distribution depots and retail pharmacies to serve remote areas which were hitherto unprofitable to the private distributors. This development was vitally needed in conjunction with the plans of the Health Ministry for 1960-65, which resulted in a 58% increase in the number of rural health units for instance.

Imports

GOPCA's control and reduction of foreign drug imports gave the domestic pharmaceutical industry an important measure of protection which enabled the firms to make full use of their increased production capacity. But local companies have nevertheless remained totally dependent on GOPCA for providing them with the necessary imports of raw materials and foreign machinery which we have shown to be of critical importance to their operation. Planning and coordination of imports

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1. Memorandum on Working Conditions at GOPCA and the Compensation of Employees, presented by Dr. Nabawi Al Mohandes, Minister of Health, to the Treasury, 11th May 1963.

for the various needs of the industry can therefore be considered as the major responsibility of GOPCA to this day.

Since 1965/66, and in spite of GOPCA's increased autonomy and the financial self-sufficiency of the pharmaceutical sector as a whole, the execution of plans has been continuously frustrated because of the inability of GOPCA to obtain its annual projected needs of foreign currency from the Treasury. This situation began in 1966, when GOPCA had aggregated all the estimated requirements of imported drugs, pharmaceutical chemicals and medical appliances for the market for the following financial year, 1966/67. The estimated needs of foreign currency were put at £E 16.600 million, and applied for from the Treasury. This figure constituted a 14% increase over the actual expenditure of foreign currency in the previous financial year (as can be seen from Table 46), and can therefore be judged as consistent with the general increase in consumption of drugs and health services which was taking place in this period. From 1960/61 to 1965/66, GOPCA had annually increased the import of raw materials chemicals at the expense of finished drug imports and thus achieved very real savings in foreign currency when measured in relation to the total supply of foreign and domestically produced drugs on the Egyptian market. The value of sales of all drugs (total consumption) can thus be seen to have grown by 128% (p.165, Table 30), while expenditure on foreign currency increased by only 44% over this five year period, 1960/61 to 1965/66.

Table 46. Development in Foreign Currency Devoted to the Import of Drugs, Pharmaceutical Chemicals and Medical Appliances. £E millions. FOB prices

Year	Hard Currency Funds		Trade Agreement Funds		Total	Allocation of Total		
	£E mil.	% to Total	£E mil.	% to Total	£E mil.	Drugs £E mil	Pharm. Chems. £E mil	Medical Appliances* £E mil.
60/61					9.333	7.844	1.030	0.459
61/62	10.621	92%	0.879	8%	11.500	6.802	2.530	2.167
62/63	12.677	94%	0.823	6%	13.500	7.625	3.194	2.681
63/64	12.600	96%	0.537	4%	13.138	6.443	4.097	2.597
64/65	11.483	81%	2.728	19%	14.211	4.899	5.080	4.232
65/66	9.238	73%	3.406	27%	12.645	4.440	5.299	2.905
66/67	5.607	64%	3.144	36%	8.751	2.806	3.386	2.558
67/68	4.699	62%	2.938	38%	7.638	2.813	3.216	1.668
68/69	6.876	65%	3.782	35%	10.657	4.151	3.876	2.630
69/70	10.473	63%	6.092	37%	16.565	5.102	6.708	3.248
70/71	9.199	61%	5.818	39%	15.017	3.000	8.375	3.747
71/72	7.313	49%	7.650	51%	14.963			

Source: Department of Planning of GOPCA.

* This column includes all medical appliances for hospitals, all laboratory equipment for research and University departments, and all machinery for the manufacturing pharmaceutical firms.

The Treasury now decided, in 1966, to reduce GOPCA's allowance of foreign currency for 1966/67, and made available £E 12.1 million instead of the £E 16.600 million applied for by GOPCA.[1] In addition to this great reduction, more than half of the total allowance was to be executed in trade agreement funds, which further magnified the problems faced by GOPCA. The Chairman of GOPCA's Board of Directors warned that the limitations placed on GOPCA's use of hard currency would result in a complete rundown on inventories of drugs and raw materials in the country by the end of 1966/67, and that only two-thirds of the

1. Memorandum on the Suggested Allocation of Foreign Currency voted to GOPCA for 1966/67. Dr. Abdou M. Sallam, Chairman of the Board of Directors of GOPCA, 15 September 1966.

£E 6.75 million allowance in trade agreement funds could actually be spent because of difficulties in finding the appropriate needs of the Egyptian pharmaceutical market in countries of Eastern Europe[1] (with whom Egypt operates through trade agreements). A look at Table 46 shows that in fact only £E 3.144 million were spent by GOPCA through trade agreement funds, or less than half of the total allowance for 1966/67.

The difficulties faced by GOPCA in having to rely on Eastern European countries for its supply of pharmaceuticals seem to stem from two related factors. On the one hand, Egypt's needs for imported drugs is limited to the small group of most recently discovered therapies for which domestic firms have not yet acquired the know-how to produce (or the necessary patented raw materials). But Eastern European countries are not in a position to produce these drugs either, since they are discovered and patented by the multinational firms based in the Western World. On the other hand, Egypt's needs for imported pharmaceutical chemicals can normally be supplied from Western Europe at far more competitive prices than those tendered by Eastern European countries. According to the Head of the Department of Planning at GOPCA, GOPCA has consistently favoured imports from countries with whom Egypt has trade agreements, and this has meant allowing a 10% preferential treatment on the prices quoted by these countries. However, GOPCA has in fact been forced to accept prices of Eastern European countries to stand at up to 23% above competitive quotations from Western Europe so as to be able to purchase pharmaceuticals from Eastern Europe. Dr. Al-Kattan also pointed out that

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1. Ibid.

Eastern European countries would much prefer to export finished drugs to Egypt.[1]

It would therefore seem that Eastern European countries are in a very similar situation to Egypt in terms of their competitive position on the international market. The potential for supplying finished drugs at competitive prices on the world market exists for Egypt[2], as it obviously does for Eastern Europe (and this is confirmed by the observations made in Footnote 2 on page 103). But the supply of raw material chemicals at competitive prices is generally difficult for such countries because they themselves are dependent to a very large extent for their raw material needs on imports from the West. Eastern Europe is of course moving much faster than Egypt towards becoming self-sufficient in this respect, and countries like Roumania for instance, are reported to have become major suppliers of penicillin on the world market at very competitive prices.

4. Experience of the Industry with Backward Integration

The idea of setting up domestic primary producing facilities for the more widely consumed drugs in Egypt started in 1954, as described in Chapter II. The earliest assessment of the market for drugs was made by the Committee for Health Services, who collected data on the consumption of different groups of drugs, and recommended that drugs in the five most commonly used groups should be manufactured domestically. The logic behind the recommendation was very simply that the

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1. Interview with Dr. Madhat Al-Kattan, Head of Planning Department at GOPCA, Cairo, 1972.

2. This potential has not been exploited as yet, although GOPCA is fully aware of the possibility of exporting a large number of domestically produced drugs to markets in Africa and the Middle East at competitive prices and with significant earnings of foreign currency. A very interesting field study was performed by Dr. Hassan Abbass, Director of Planning, Alexandria Company, during his visit to Nigeria in 1972, which showed that there exists a very large potential for Egyptian exports of drugs to that market.

sales value of these groups - salycilates (mainly aspirin), sulpha drugs, penicillin, streptomycin, and chloramphenicol - accounted for a substantial portion of total sales on the market, and economies of scale could therefore be achieved in their bulk manufacture, with a resulting saving in foreign currency.

Concrete projects for the basic manufacture of each group of drugs were made in conjunction with the first five year economic plan started in 1957. As detailed in Chapter II, capital investments in the existing private processing firms were encouraged by the Ministry of Industry who supplied long-term loans to these companies for the expansion and diversification of their production capacity, with the technical co-operation of foreign firms. But production capacity required for, or experience in, backward integration was totally non-existent in the pharmaceutical industry and plans for primary production had to be formulated and executed by the government alone.

As mentioned in Chapter III, foreign currency was in short supply and the capital requirements for setting up primary producing chemicals and fermentation plants are relatively large. Russian co-operation was therefore sought for the finance of the projects, the import of machinery and the transfer of technical know-how. In January 1958, the Nasr project was included in the economic and technical agreement signed between Egypt and Russia. The decision was also taken to build all five plants in one area, with prospective economies of scale in the cost and maintenance of public utilities required by the five plants (road works, electricity and water supplies, sanitation, effluent disposal), and in the costs of buildings and equipment necessary for research and quality control. A desert site of 120 feddans (165 acres) at Abu Zaabal, North East of Cairo, was chosen to set up the five plants.

The first serious economic evaluation of the project was started in 1959 by members of the General Organisation for the Implementation of the First Five Year Plan for Industry. Capacity was estimated at 25% above existing consumption levels, but this level was still below what Russia considered as the minimum economic size. It was therefore decided to build plants of twice the size first estimated and it was thought that excess output would be exported to neighbouring countries. In retrospect, domestic consumption levels more than doubled within a few years of the study, and by the time the plants were working at full capacity, the output of aspirin and penicillin were below the total requirements of the Egyptian market. The first miscalculation can therefore be seen to have been a shortsighted view of the growth of domestic demand for drugs.

An Egyptian delegation of doctors, chemists and engineers first visited Russia from September to November of 1959 to discuss the project. The Egyptian party requested from its Russian counterpart an economic evaluation of the project, but this was refused on the pretext that such an evaluation was not one of the conditions agreed upon in the preliminary talks, and that it was also outside the sphere of negotiations in any other agreement between Russia and Egypt.[1] But Russia would supply Egypt with figures on quantities of raw materials required for production and their international prices, figures on fuel and other services needed in the production process, as well as figures on depreciation allowances made on Russian machinery and equipment.

The Egyptian General Organisation in charge of implementing the first five year plan for industry was therefore assigned the task of

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1. The General Organisation for the Implementation of the Five Year Program for Industry, "The Economic Study of the Nasr project for Pharmaceutical Chemicals", 22 June 1960.

making the project appraisal with the aid of figs. supplied by the Russian party. According to the study prepared, it was obvious that the project would be running at a loss in the first years of its operation, as most required raw materials would not yet be available domestically (and this would raise the value of imported chemicals with shipping and transport charges), and capacity at the plants would not be fully utilised. At full capacity, the estimated annual loss from the project was not very large, as can be seen from Table 48. But the calculations made included the processing and packaging by Nasr of 36% of its output of sulphas, 33% of aspirin, 87% of chloramphenicol. The addition of a processing unit to the Nasr project for the formulation of bulk active ingredients into their dosage forms was in fact estimated to raise the value of total output at full capacity from £E 708,695 to £E 1,332,595. The contribution of processing operations was therefore crucial as a means of counterbalancing the loss from the primary producing operations. This is even more clearly shown by the fact that the study suggested that an additional processing unit for 5.29 tons of penicillin and streptomycin plus 1.25 tons of chloramphenicol would bring in net profits of £E 115,000 annually.[1]

Capital Costs of the Project

As can be seen from Table 47 total expenditure on fixed assets in 1964/65 (the first year of operation) stood at £E 8 million as opposed to the 1960 estimate of £E 4.4 million. This considerable increase in capital expenditure can be identified as increased expenditure on three main types of assets: utilities and roads, machinery, and preliminary expenses.

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1. Ibid.

Table 47. Estimated and Actual Balance Sheet of Nasr Chemicals Co.
Values in £E. millions

1960 Estimates			Actual Figures for 1964/65		
Debits			Debits		
Capital	3.000		Capital	6.000	
Russian Loan	2.200		Russian Loan	2.000	
		5.200			8.000
Assets			Assets		
Land	0.040		Land	0.060	
Buildings	0.740		Buildings)	2.171	
Utilities and Roads	0.607		Utilities and Roads)		
Machinery	1.867		Machinery	2.852	
Means of Transport	0.048		Means of Transport	0.064	
Preliminary Expenses	0.410		Preliminary Expenses	1.489	
Liquid Assets	0.655		Liquid Assets	1.364	
		4.367			8.000

Source: Economic Study of the Project, by the General Organisation for The Implementation of the Five Year Program for Industry. Figures for 1964/65 (first year of operation) from actual balance sheet of Nasr.

Note: The difference between total debits and total assets in the estimate for 1960 (£E 833,000) consitutes an addition to Nasr's capital over and above the estimated cost of assets and was supposed to cover the estimated losses in the first years of operation.

Table 48. Estimated and Actual Costs and Revenues of Nasr Chemicals
Values in £E. millions

1960 Estimate			Actual Figures 1966/67		
Value of Output		1.333	Value of Output		1.143
Production Costs			Production Costs		
Raw Materials	0.333		Raw Materials		
Wages and Salaries	0.197		Wages and Salaries	0.525	
Indirect Manufacturing Costs	0.520		Indirect Manufacturing Costs		
Distribution Costs	0.058		Distribution Costs		
Administration Costs	0.137		Administration Costs		
Interest Payments	0.150		Interest Payments	0.163	
Total Cost		1.395	Total Cost		2.099
Annual Losses		0.062	Annual Losses		0.956

Source: Economic Study of the Project, by the General Organisation for the Implementation of the Five Year Program for Industry. Figures for 1966/67 from actual profit and loss account of Nasr.

The cost of supplying the site with water, electricity and roads, in a desert area which lacked any existing facilities proved to be several multiples of the estimated £E 607,000 in the 1960 study. The water station alone cost Nasr £E 600,000 because of the enormous quantities of water necessary for the chemical synthesis operations. The supply of electricity and sanitation works were again to cost Nasr gigantic sums in relation to the estimates.

The cost of machinery can also be seen to have risen to more than twice the estimate of £E 1.867 million in the 1960 study. This was due to the need for various modifications to the Russian plans, as will be detailed further on. An additional plant for the production of chlorsulphonic acid (which was not accounted for in the original study) was also built because the needs for imported quantities of that raw material was going to cost Nasr annual sums in excess of £E 90,000.

Preliminary expenses were again greatly inflated by the need to reorganise production processes because of numerous difficulties which arose during the construction period. Completion of the plants was therefore delayed, and caused increased expenditure on research at £E 978,521 and on Russian advisors at £E 110,056.[1]

Because of the large increases in expenditure on fixed assets, the annual general meeting of the Board of Directors of Nasr voted in July 1963 in favour of an increase in capital from £E 3 million to £E 6 million, the increase being financed by annual allocations from the Treasury (through GOPCA) in the period 1964/65 to 1966/67. But continued losses by Nasr over this period prevented it from recovering preliminary expenses which amounted to one-quarter of Nasr's owned capital. In March 1968, the Board of Directors of Nasr therefore decided to re-

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1. Memorandum to the General Meeting of GOPCA's Board of Directors concerning the Reduction of Capital of Nasr Chemicals by £E 1,489,000. Summer 1967.

duce owned capital by £E 1.5 million, equal to the sum exhausted by the company on preliminary expenses.

Costs and Revenues from the Operation of Nasr

The results of Nasr's operation have shown large and sustained losses throughout the 1960's, although its position has slightly improved in later years. Before going into details of the specific production problems met in each of the plants, one can identify three basic problems which have considerably affected the profitability of all Nasr operations.

Labour Costs - The number of workers and employees required for the operation of Nasr were originally estimated at 898, receiving annual wage and salary payments of £E 196,000. By 1964/65 total numbers employed in the construction of the plants were naturally very high, standing at 2,245. According to employment policies in Egypt, Nasr was forced to keep all the excess labour until alternative occupations could be found at other establishments for the numbers which were not needed. Total employment at Nasr fell very slowly as can be seen from the following Table, with the obvious additional costs incurred on wage and salary payments.

Table 49. Employment and Wage Bill at Nasr, 1964/65 to 1970/71

Year	64/65	65/66	66/67	67/68	68/69	69/70	70/71
No. of Workers and employees	2,245	1,985	1,666	1,614	1,577	1,582	1,572
Wages and Salaries £E million			0.525	0.497	0.548	0.590	0.628

Source: Figures obtained at Nasr Chemicals Co. 1972.

Cost of raw materials - According to the economic study of the Nasr project, a great number of raw material chemicals necessary for production were to become available domestically during the first five year plan as by-products of the petrochemical, fine chemicals and food industries. The estimated prices of these raw materials were calculated at prevailing international prices without the addition of shipping or customs charges. The prices of foreign imports of chemicals were estimated at their CIF cost at Alexandria docks with the addition of a mere allowance of 2% for customs charges plus £E 25 per ton for transport to Nasr.

But most raw materials that were expected to be produced domestically failed to become available in sufficient quantities or at the required standard of purity. Although many of these raw materials were extremely low in price per ton on the international market, the addition of shipping and other import charges was to multiply their total cost to Nasr. A comparison of actual costs of the raw materials to Nasr in 1966/67 with the estimated costs of the 1960 study shows actual increases of between 44% and 760% for twenty essential raw materials.[1] This resulted in considerable increases in total costs of raw materials per unit of output. Table 50 compares the actual with the estimated total cost of raw materials necessary for the production of one ton of each pharmaceutical chemical manufactured at Nasr, columns (1) and (2).

A comparison of columns (2) and (4) in Table 50 shows that the ratio of raw material costs per unit of output to the value of this unit of output (one ton) at 1966/67 prices was ridiculously high.

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1. Report on the Economics of the Nasr Company for Pharmaceutical Chemicals, prepared by Nasr Company, 1967. Appendix 1.

Table 50. Comparative Raw Material Costs of Production at Nasr. Values in £E.

Product	Unit	(1) 1960 Estimate	(2) 1966/67 Costs	(3) Modified Costs*	(4) Price of Product 1966/67
Sulphanilamide	1 ton	890	1,835	916	1,250
Sulphaguanidin	1 ton	1,058	2,036	1,462	1,600
Sulphadimidin	1 ton	1,907	3,385	2,672	3,750
Asprin	1 ton	279	412		950
Sodium Salycilate	1 ton	383	477		1,000
Methyl Salycilate	1 ton	296	416		1,250
Salycilamide	1 ton	1,091	1,304		1,250
Penicillin 1 : 3	1 ton	9,138	20,299	9,617	14,500
Chloramphenicol	1 ton	25,834	30,061	11,114	23,000

Source: Report on the Economics of the Nasr Company for Pharmaceutical Chemicals, Op.cit., Appendix '4' and '5'.

* Modified costs were those incurred in using a modified production process.

Nasr management therefore studied all possible means of lowering costs, and found that raw material costs per unit of output could be reduced considerably by actually reducing backward integration. A reduction in the number of processing stages carried out at Nasr could be achieved by importing semifinished chemical intermediates instead of basic raw material chemicals and performing a more limited number of operations (synthesis).

The savings in raw material costs per unit of output achieved by using the modified production operations at Nasr were significantly high as can be judged from a comparison of columns (2) and (3), which shows savings ranging from 20% to 58%. This new and curtailed method of production was first applied to Chloramphenicol, Penicillin and the Sulpha compounds, and in later years was also adopted for the production of aspirin and the salycilates. The new method obviously achieved savings in other manufacturing costs as well as in raw material costs,

and a third result was an increase in production capacity for every single type of product. In the first year when the new production process was applied for instance, the output of different sulpha compounds increased by 50% to 600% over original capacity of the project, and chloramphenicol more than doubled.

But this new solution to Nasr problems was only able to reduce the losses from the project, not eliminate them. It can be seen from Table 50 that raw material costs of the modified process were still above the original estimates, which had involved some losses - comparison of columns (3) and (2). The exception was chloramphenicol, whose price had gradually fallen since 1960 due to increased competition on international markets and its raw material intermediate could also be purchased at lower prices. Finished Chloramphenicol in bulk powder could thus be purchased on the international market at £E 10,063 per ton in 1966.[1]

Formulation into Dosage Forms - The original economic study of the Nasr project planned that the company would process a very large proportion of its output of pharmaceutical chemicals into dosage forms, thereby increasing sales value and profitability of the project. But by the time Nasr began producing in 1964/65, pharmaceutical processing firms (the seven) had been nationalised and their capacity for dosage formulation was very large. GOPCA therefore felt that on account of the long experience of processing firms with formulation, they could perform the formulation and packaging operations with greater efficiency[2] than Nasr. Nasr was thus deprived of an important source of revenue from processing operations.

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1. Tenders obtained by GOPCA in 1966.

2. Memorandum from Nasr Chemicals to GOPCA concerning the pricing of Nasr output, 5 July 1967.

The three sets of problems detailed above can be judged as external to the company's performance since Nasr could not be held responsible for their causation. But there were many specific technological problems in the operation of each of the five main production plants at Nasr which made productivity of capital equipment and installations very low in comparison to international standards.

Penicillin Production[1]

In the manufacture of penicillin, economies of scale are extremely important in fermentation and extraction stages of production. The capacity of single fermentors used by the multinationals for instance range between 200 and 250 cubic metres, pilot scale capacity is up to 50 cubic metres and laboratory scale is often 10 cubic metres. At Nasr, eight fermentors were imported from Russia, with a capacity of 10 cubic metres each. The small size was expected to minimize the risk of losing output during the fermentation process (which lasts six to seven days) when sterile conditions must be maintained. Differences in the productivity of the strain producing penicillin can also cause considerable differences in the efficiency of production. Whereas strains used by multinational plants have a productivity ranging between 15,000 and 17,000 units per million, those strains delivered by the Russians had a much lower productivity of 6,000 to 7,000 units per million. It was also explained that in Russia, strains with a much higher yield than those delivered to Nasr are available.

Two of the raw materials used in the fermentation process - Lactose (a by-product of the dairy industry), and Corn steep liquor (for which local output was contaminated with traces of copper) - failed to become available from domestic industry as expected during the first five

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1. Information obtained from interview with Dr. Ahmad Al Fiky, Director of the Fermentation Plant at Nasr Company, Abu Zaabal, 21 February 1972.

year plan 1960-65. This raised the cost of shipping and transporting these raw materials to Nasr.

The fermentation process is followed by filtration and extraction. The extraction equipment delivered by the Russians is again reported to have been of very low efficiency. Instead of providing Nasr with one large separator as used by plants of the multinationals, twelve separators were delivered, each requiring longer steps and therefore more costly stages to arrive at the intermediate product.

The equipment used in transferring technical penicillin to sterile salt ready for sale was also found to be of low standard, the pipes having rusted and needing replacement. First batches of penicillin salt were therefore contaminated with rust and had to be destroyed.

Because of the problems encountered and the low productivity of equipment, the whole manufacturing process was finally costing Nasr £E 300 per kilogram of finished penicillin salt in contrast to a price ranging between £E 18 and £E 20 per kilogram on the international market. Egyptian management at Nasr eventually decided to build an entirely new plant for the production of penicillin with machinery imported from England (Gusti Co.) and know-how purchased from a Dutch firm (Delft Mycofarm). In 1967/68, with a complete reorganisation of the production line and sterile area, the production of penicillin was experimented. Actual production was restarted in March 1969, with a smaller degree of backward integration. The production process is now started at a more advanced stage, by-passing fermentation. Potassium salt technical grade is now imported for manufacturing procaine penicillin and sterile potassium salt in the sterile area.

Because of the difficulties encountered in penicillin production, the management at Nasr refused to begin producing streptomycin on account of similar problems which it was expected would arise. The

capacity of fermentors was too small, the yield of the strain too low, and at full capacity, the plant could only supply an estimated 2.5 tons per year while domestic consumption had already risen to 40-50 tons per year in Egypt.

Since the fermentors could not be efficiently used for their intended purpose, the group of managers began experimenting for alternative possibilities for their use. After screening a large number of products, three types of enzymes were chosen which could be manufactured economically with the unused fermentor capacity: Amilase which is used in desizing fabrics in the weaving industry, proteaze which is used in leather tanning, and ladinaze which is used in the production of detergents. All these production processes were developed independently of foreign know-how, but with some assistance from research departments of Egyptian universities. The processes used employ locally produced raw materials and the three enzymes are commercially successful products.

Salycilates[1]

The basic chemical raw material for the production of this group of chemicals is coke, but the raw material failed to become available domestically. The main product manufactured by this process is Aspirin which is available at very competitive prices in the world market because of its long history since discovery and development.

The production of aspirin starts with the synthesis of chemicals into salycic acid on which a further chemical process is performed to arrive at sublime salycilic acid from which either aspirin or methyl salycilate or sodium salycilate can be synthesized.

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1. Interview with Dr. Al Sawy, Managing Director of Nasr Chemicals Company, 21 February 1972.

Russian equipment had a capacity for sublimation of 100 tons, when the economic scale is 2000 tons.

Because the basic raw materials did not become available domestically, Nasr management decided to cut down the number of processing stages and reduce dependence on a vast number of imported raw material chemicals. It was decided to buy salycilic acid from Roumania ready for further processing into Aspirin. The capacity for sublimation was also increased and the purchase of additional acetylators increased total capacity for Aspirin production from 90 tons in 1965/66 to 250 tons in 1969/70 to 370 tons in 1970/71. The demand for aspirin on the domestic market was estimated at 450 tons in 1969/70.

Chloramphenicol[1]

Russian technology, when used, involved the use of 300 tons of raw material chemicals to arrive at 1 ton of bulk chloramphenicol powder. Chemical processes involved thirteen manufacturing stages which Nasr management again reduced to two by importing the necessary raw material intermediates and thus achieving vast savings in costs and an increase in total capacity for finished Chloramphenicol powder.

A modified process was later adopted with the assistance of Carlo Erba, an Italian pharmaceutical company in giving Nasr up to date technology. Terms of the agreement involved the payment of 5% royalty on the value of production for less than ten years.

Sulpha Compounds[2]

Russian technology and know-how again proved to be inefficient. Available capacity could be doubled for all processing stages by a complete reorganisation of the production process. The co-operation of ICI (Britain) was sought in 1971. Until this date, Nasr had been

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1. Ibid.

2. Interview with Dr. Aly Sina, Chairman of Board of Directors of Nasr Chemicals Company, Abu Zaabal, February 1972.

importing technical sulfanilamide (intermediate) at an annual rate of 120 tons.

ICI would now assist Nasr in the production of this chemical intermediate and thus achieve savings to Nasr of between £E 150,000 and £E 290,000 annually. ICI technology would also increase production capacity for finished sulpha compounds to twice their levels before 1971, meaning an increase in the value of their sales to approximately £E 500,000.

ICI was to charge royalty payments of 5% on production value in sterling currency (estimated at £E 25,000 annually). The royalties payable would be calculated on production valued at the arbitrary price at which ICI sells the same products on the international market at the time when the contract was signed.

Development in Prices and Profits

In the two years 1964/65 (first year of production) and 1965/66, Nasr was allowed to select the price at which it would sell its output. Because production was not yet on-stream, pricing was made according to projected production costs in the following years. It can be seen that the prices chosen were far above the estimates made by the economic study in 1960.

Table 51. Development in Pricing of Nasr Products, 1964/65 to 1970/71
Ex-factory Prices in £E. per ton.

Product	1960 Estimate	1964/65	1965/66	1966/67	1969/70	1970/71
Sulphanilamide	550	1,979	6,000	1,250	3,093	3,610
Sulphaguanidin	800	4,217	4,751	1,600	3,805	4,619
Sulphadimidin	2,000	9,040	9,616	3,750	5,867	6,625
Chloramphenicol	40,000	66,782	51,000	23,000	34,588	44,512
Aspirin	400	1,013	1,000	950	1,135	1,200
Penicillin 3 : 1	15,000	-	-	14,500	25,538	25,538

Source: Prices obtained at Nasr Chemicals Company, February 1972.

During 1965/66 Nasr was also allowed to distribute to local firms imported chemicals of the types produced at Nasr (Nasr output did not cover more than one quarter of these needs). This policy was intended to ensure some balance between the prices at which Nasr output and other imported chemicals were being sold to the processing firms. It also gave Nasr an important source of revenue in that year, since 75% of its sales were of imported chemicals.

In 1966/67, GOPCA decided to fix the prices at which Nasr output was being sold, to make them more consistent with international prices (see Table 52, Columns (1) and (2)). This meant very large reductions on prices of 1965/66, as Table 51 shows.

Table 52. Comparison of Price of Products Sold and Raw Materials Purchased by Nasr with International FOB Prices, 1 July 1966

Product	Unit	International Price of Product (1)	Nasr Price of Product (2)	% (2) to (1)	International Price of Raw Materials necessary per ton of Product (4)	Price to Nasr of Raw Materials necessary per ton of Product (5)	% (5) to (4)
Sulphanilamide	1 ton	633	1,250	198	833	1,876	225
Sulphaguanidine	1 ton	697	1,600	230	913	1,966	215
Sulphadimidin	1 ton	1,347	3,750	278	1,924	3,076	160
Aspirin	1 ton	558	950	170	243	537	221
Sodium Salycilate	1 ton	503	1,000	199	340	706	207
Methyl Salycilate	1 ton	465	1,250	269	154	371	241
Salycilamide	1 ton	525	1,250	239	329	1,124	342
Chloramphenicol	1 ton	10,063	23,000	229	20,602	27,865	135

Source: Memo presented to Board of Directors of GOPCA concerning the Report by Nasr on the fixing of the price of its Products. Summer 1967.

Note: Price to Nasr of raw materials necessary for the production of one ton of each output includes locally produced chemicals. (raw materials prices include Shipping and Transport costs).

The FOB prices in column (1) of Table 52 were average quotations received by GOPCA in 1966. For instance, supplies of bulk chloramphenicol powder could be obtained on the international market at prices ranging from £E 7,654 to £E 11,007 and Aspirin could be purchased at prices ranging from £E 306 to £E 605.

The fixing of prices by GOPCA was a temporary measure for 1966/67 at the end of which Nasr was asked to present a new appraisal of its profit and cost position for further study at GOPCA. On July 22nd, 1967, Nasr forwarded to GOPCA a detailed report on its operations, and demanded that the price of its output be fixed in relation to the costs it incurred on the purchase of raw materials. It was therefore decided that the international price standard would be used for comparing both raw material costs and finished product prices. Nasr would be allowed to sell its output at the same multiple ratio to international prices as Nasr raw materials cost in relation to international prices for raw materials. This calculation was made according to the figures offered by Nasr and the international prices obtained from GOPCA's department of imports.

Wherever the ratio of Nasr raw material costs to international raw material costs was above the ratio of Nasr prices to international prices of products, Nasr would be allowed to raise its price. In other words, the percentage in column (6) of Table 52 would dictate the price increase allowed. But it was obvious that $N_a$sr would still be making losses since it had an insignificant or negative margin above raw material costs from which to recover all other costs of production. Nasr also demanded that it should be allowed to process most of its output into dosage forms so as to increase the margin between selling price and costs, and GOPCA made a study of relative processing costs at Nasr and the seven pharmaceutical firms. It was found that the seven nationalised companies which specialise in processing pharmaceutical chemicals

into their dosage forms could operate with much lower costs. GOPCA therefore decided that it was more efficient to allow even higher price increases on Nasr output of bulk pharmaceutical chemicals which could easily be absorbed by the processing firms, rather than letting Nasr perform those processing operations.

It is surprising that all the studies and reports exchanged between Nasr and GOPCA made no serious comment on the actual technology of production which can be judged to be the major cause of Nasr 's problems. Ignoring the variations in cost to Nasr of raw material chemicals, a close look at Table 52, which was used by both GOPCA and Nasr to fix prices, gives a very clear picture of the effect of using inefficient methods of production.

A comparison of international FOB prices for final pharmaceutical chemicals in their bulk form, column (1) in Table 52, with the international FOB value of all raw material chemicals necessitated by the production process, (column 4) in Table 52, shows that for all types of output except the group of salycilates, the value of raw materials needed for production are well above the value of the finished product on world markets. The ratio between international costs and international prices for chloramphenicol is the most amazing, raw material needs standing at more than twice the value of the finished output on world markets. This confirms the comment made by a Nasr representative that the Russian technique for producing chloramphenicol was extremely inefficient, using many more stages of synthesis than international standards and consuming in the process 300 tons of raw materials to arrive at one ton of chloramphenicol.

Because of the many changes which have taken place over the seven year period considered, it is not very useful to compare the annual changes in accounting profits or losses of Nasr operations. The

influence of distribution activities, price changes and subsidies received has affected the annual results achieved in different directions. But one can say that the financial position of Nasr has slightly improved in 1969/70 and 1970/71. The company has received no direct subsidies in those two years, although processing firms (the seven) have contributed a growing percentage of indirect subsidies to Nasr in the form of yet another price increase on products sold to them by Nasr in 1970/71 (Table 51).

A comparison of figures for total output and net profits from Table 53 and 54 seems to indicate that the large increases in output in 1969/70 and 1970/71 are responsible for the sudden change in profitability. This is true to the extent that prices of Nasr output were raised in 1967/68 to a sufficient level to allow it to make a small profit margin on pharmaceuticals per unit of output. Before 1967/68, it can be judged that increased output would in fact have resulted in an increase in total losses, since profit margins were negative on most products.

Since 1967/68 (and the new price level acting as a necessary condition), Nasr was able to use economies of scale in production. Since profit margins from Nasr's manufacturing operations are so slender, a minute fall in production costs (due to economies of scale) or in overheads can cause a dramatic increase in profits. This has probably been happening in the last few years, and annual financial accounts of Nasr point to a falling percentage of direct manufacturing cost to total value of output.

Management at Nasr has obviously been aware of the inefficiency involved in using the technology and machinery imported from Russia, and this is demonstrated in the general move towards reorganising production processes and seeking the technical co-operation of giant chemical concerns which have the benefit of many decades of experience in the basic

manufacture of pharmaceutical chemicals.

Nasr has also moved away from the production of pharmaceuticals and into new fields where it could make use of idle machines and equipment and produce commercially successful products. Examples on the use of fermentors were given on page 216, and Nasr has also begun the production of some raw materials chemicals employed in other industries.

Table 53. Development in Value of Production at Nasr, at 1970/71 Prices
Value in £E thousands

Product	64/65	65/66	66/67	67/68	68/69	69/70	70/71
Sulphanilamide	22	51	54	28	-	-	22
Sulphaguanidin	162	124	286	109	49	63	25
Sulphadimidin	36	101	278	197	302	100	193
Chloramphenicol	44	245	490	378	-	124	771
Aspirin	32	60	103	122	154	233	433
Penicillin	-	-	128	294	203	966	1,163
Other pharmaceutical Prod.	84	79	184	224	140	106	195
Non-Pharmaceutical Products	-	-	245	288	281	808	1,052
Total	380	660	1,768	1,640	1,129	2,400	3,854
Value of Production at Existing Prices	329	451	1,143	1,074	874	2,323	3,854

Source: Figures obtained at Nasr Chemicals Company, February 1972.

Table 54. Net Profits or Losses at Nasr, 1964/65 to 1970/71. Values in £E thousands

	64/65	65/66	66/67	67/68	68/69	69/70	70/71
Net Losses	- 800	- 840	- 960	-1,010	-1,018		
Net Profits						+ 60	+ 201

Source: Profit and Loss Accounts of Nasr Chemicals Company.
Note: Profits and Losses are net of depreciation.

Table 53 shows that total value of non-pharmaceutical products in 1970/71 accounted for almost one third of total output of Nasr. When it is remembered that the output of pharmaceuticals is sold at several

multiples of competitive prices, it becomes obvious that non-pharmaceutical products are becoming of increasing importance to Nasr's competitive position.

Chapter V

CONCLUSION

This study has traced the development of the Egyptian pharmaceutical industry throughout the two decades 1952 to 1971, and examined the structure of the international market for drugs and changes in the pattern of supply.

In its early stages of development, the private domestic pharmaceutical industry suffered from an inability to compete successfully with the giant multinational firms which dominated the Egyptian market with direct exports of finished drugs from abroad. The major factors leading to monopoly concentration and control of the market by the large international companies were shown to be marketing advantages held in the form of an extensive and well established distribution network, as well as expensive and sophisticated advertising techniques aimed at both the physician and pharmacist. The physician relied almost exclusively for his knowledge of modern therapies on the medical literature supplied by the international firms and was thus encouraged to prescribe heavily promoted innovations at the expense of the older but still suitable and lower priced preparations. The pharmacist, who plays a leading role in the choice of therapy and brand by the Egyptian customer, was also dependent for his income on the very large discounts and bonuses allowed on the sale of foreign drugs. The retail consumer was thus constrained into paying excessively high prices for most drugs.

Our analysis has shown that considerable savings could therefore be and were achieved by instituting government control on the sale of drugs. In the late 1950s the distribution of drugs to retail pharmacists was nationalised, the government placed more stringent regulations on the registration of new drugs and advertising, and a centralised

purchasing agency was formed for the purpose of importing all drugs and pharmaceutical chemicals from abroad. The immediate gain from these measures was a reduction in the price of all existing foreign drugs on the Egyptian market by 25%.

Since 1957, the government has taken steps to encourage the growth of domestic production of drugs. Local pharmaceutical firms had shown an ability to produce many drugs, but a significant proportion of existing production capacity remained idle because these firms were unable to market their preparations, even when equivalent to foreign brands. Economies of scale in production did not constitute an obstacle to the entry of local firms to the market, since the majority of these companies limited their operations to formulating and packaging finished pharmaceutical chemicals into their dosage forms, all of which are profitable on a very small scale.

The technology and know-how involved in final processing is fairly simple and straightforward for most drug groups, but foreign assistance was necessary for some important technical processes involved in the preparation of such vital drugs as penicillin, streptomycin, insulin, endocrine hormones and parenteral solutions. License agreements between local and international firms were again initiated by the government specialised agency, and the terms reached proved to be very reasonable and favourable to the Egyptian firms. The bargaining strength of a single body representing the group of local firms and the Egyptian government enabled the purchase of foreign technology, foreign machinery, and raw materials at low cost to the domestic industry, in spite of Egypt's observance of patent rights.

By the end of the 1950s, the domestic pharmaceutical industry was afforded a strong measure of protection from direct imports of drugs which could be produced locally, while foreign currency loans

supplied by the government encouraged domestic firms to invest in the more sophisticated and complex production facilities. In a new development, agreement was reached between the Ministry for Industry and a number of international pharmaceutical firms to set up subsidiaries in Egypt, with a view to ensuring that rapid growth would soon enable domestic production to supply most of Egypt's needs for drugs.

The extension of state control over the pharmaceutical industry was a slow and gradual process, several specialised committees having been set up during the 1950s to study the market for drugs and make their recommendations. In 1961 the largest Egyptian owned pharmaceutical firms were nationalised and GOPCA was created to supervise their operation, in addition to its responsibilities for importing and distributing pharmaceutical products.

It is often observed that nationalisation of private concerns results in a decline of managerial incentive to maximise returns, with adverse effects on efficiency, productivity and profits. The experience of the pharmaceutical industry in Egypt displays a rare example of significant progress as a result of public control. The success achieved by the local pharmaceutical industry can be directly attributed to the role played by the Egyptian General Organisation for Pharmaceuticals, Pharmaceutical Chemicals and Medical Appliances, GOPCA.

The pricing policy of GOPCA has dictated a price structure for drugs in Egypt which is highly competitive with international price levels. The industry has also achieved a high rate of growth in production and value added, profits accounting for more than 50% of this value added.

Loans and subsidies from the government enabled the industry to increase capital investment more than fivefold in the period 1957 to 1965/66. Since this period, the industry has financed its own continued growth and has also transferred large surpluses to the rest of the economy.

The Egyptian pharmaceutical industry is still dpendent on the international market as a major source of supply for raw material requirements, and this dependence is only likely to diminish when the Egyptian chemical and other auxilliary industries have developed sufficiently to produce raw materials competitive at world prices.

We have thus shown that in spite of increased self-sufficiency in the supply of finished drugs on the market, domestic firms accounting for 87% of total domestic consumption are still very heavily dependent on the international market for the import of basic raw materials and intermediates at competitive prices. But this has in no way obstructed the growth or profitability of domestic production.

In addition to providing Egypt with low priced drugs, the pharmaceutical industry has contributed all the benefits expected from a profitable investment. By 1970/71, it has provided employment for seventeen thousand workers and employees and has transferred £E 8 million of net revenue in that year to the Treasury. But GOPCA has also achieved considerable savings in foreign currency to the Egyptian economy; in the five year period 1960/61 to 1965/66 alone, total domestic consumption of drugs increased by 128% while total expenditure on foreign currency (including the purchase of finished drugs, pharmaceutical raw materials, machinery and equipment) increased by a mere 44%. The ratio of total expenditure on foreign currency to total domestic consumption of drugs thus fell from 62% in 1960/61 to 37% in 1965/66.

Our study has also suggested that Egypt has a potential for exporting a large volume of finished drugs, both in terms of existing production capacity and in terms of the industry's ability to offer drugs at world competitive prices. A more concerted effort from GOPCA towards designing an efficient export policy would promote the growth of export on a more pernament basis, and also reduce the problems arising from foreign currency shortages from which the industry has suffered since the mid-sixties.

The Egyptian pharmaceutical industry has relied on direct foreign investment to a very small extent when compared to other countries in Egypt's stage of development. Foreign subsidiaries of multinational firms account today for 16% of total output of the industry, a rate which has been maintained since the mid-sixties, when these subsidiaries first began to produce. But the main form of foreign participation in the operation of the domestic pharmaceutical industry has been the development of numerous license agreements between local and international firms for the acquisition of technology and know-how by local firms. After taking an active part in the negotiations over the first agreements contracted in the late 1950s, GOPCA standardised the terms for any future agreements, and local firms were encouraged to seek new contracts independently, whenever problems in the production of new drugs would arise.

The conditions laid down by GOPCA in the standard form of license agreements confers benefits on both licensor and licensee when compared to conditions obtainable in a free market situation. Transferable royalties are low, and payable for a maximum of five years. To the local firm, this means a low price for acquiring know-how which can continue to be used long after five years, since the life expectancy of a drug is much longer in Egypt than in a free market, and because GOPCA's policy insures that only those drugs of sufficient medical importance are produced domestically. The licensor's advantage is that he is given complete freedom to market his product independently, and he can therefore promote the rate of increase of sales and maximise royalty payments within the five year period (which is longer than the average life expectancy on a free market). Moreover, the licensee makes a large contribution towards the licensor's marketing expenditure in local currency.

This expenditure can therefore be expected to make the international licensor's returns on sales considerably higher within the five year period, especially when it is remembered that the licensor's products, like all other domestically produced preparations, are afforded complete protection from imports of equivalent drugs from other producers.

This thesis has shown that production under license costs the Egyptian economy significantly less than importing the same group of drugs from foreign sources. It has also shown that domestically, local firms produce drugs at much lower cost than foreign subsidiaries and also sell their output at lower prices. The reasons are mainly the fact that local firms purchase foreign raw material pharmaceutical chemicals at lower prices, and spend significantly less on selling and administration expenses. The cost and price structure of production of subsidiaries in Egypt conform with our analysis of the behaviour of the multinational firms in the markets of advanced countries. These firms rely on excessive and wasteful expenses on innovation and marketing, with the result that prices at which they offer their products are necessarily inflated to levels which are far above manufacturing costs.

But an important revelation from Egypt's experience in the acquisition of foreign know-how and basic pharmaceutical raw materials is that the gian multinational firms are also potentially the most competitive sources for the purchase of technology and raw materials. Egypt has dealt with countries in both the East and the Western world, and our analysis of its experience clearly points to the comparatively lower costs incurred in buying raw materials or technology from the old established pharmaceutical giants.

The type of drugs most widely consumed (or most appropriate medically) on the markets of developing countries are products which have been on the international market for a long time, for which economies

of scale are of great importance in manufacture and increasingly efficient methods of production are continuously being introduced. The leading manufacturers engaged in the production of the pharmaceutical raw materials necessary for processing these drugs are the giant multinational firms. There is therefore great scope for increased co-operation between local pharmaceutical industries in developing countries and the large international firms, provided adequate provisions are made for obtaining reasonable terms for the developing country.

Finally, our analysis has shown that backward integration in the pharmaceutical industry is extremely uneconomical to a developing country in the absence of any domestic potential for supplying large numbers and quantities of raw materials required for primary production.

It was also shown that the positive benefits obtained by the economy from the secondary manufacture of pharmaceuticals were in no way dependent on the existence of primary producing facilities in the country in question.

APPENDIX

Table 55. Consumption of All Drugs in Egypt according to Therapeutic Groups. Retail Prices, Value in £E. Millions .1970

Therapeutic Groups	Imported Drugs	Domestically Produced Drugs			Total	% to Total Consumption
		Local	Licensed	Total		
Anaesthetics	0.133	0.004	-	0.004	0.137	0.3%
Analgesics	0.184	2.251	1.215	3.487	3.650	8.4%
Analeptics	0.154	0.101	0.051	0.152	0.306	0.7%
Anthelmintics	0.183	0.158	0.082	0.240	0.422	0.9%
Antidysenterics	0.191	0.811	0.478	1.290	1.480	3.4%
Antiobiotics	0.566	3.515	2.900	6.414	6.980	16.0%
Antimalarial	0.015	0.021	0.061	0.082	0.096	0.2%
Anticoagulents	0.025	0.016	0.020	0.036	0.061	0.1%
Antihistaminics	0.049	0.334	0.266	0.601	0.650	1.4%
Cardiac	0.445	0.717	0.379	1.095	1.540	3.5%
Cathartics	-	0.311	0.080	0.392	0.392	0.9%
Chemobiotics	App.0	0.010	0.019	0.028	0.028	App. 0
Anti T.B.	0.028	0.612	-	0.612	0.640	1.4%
Spirochaeticidal	-	0.004	-	0.004	0.004	App. 0
Sulphonamide	0.012	0.488	0.275	0.763	0.775	1.7%
Cytotoxics	0.038	-	-	-	0.038	App. 0
Dermatologics	0.399	0.914	0.056	0.970	1.370	3.1%
Anorectal	0.013	0.048	-	0.048	0.060	App. 0
Diagnostic	0.072	-	-	-	0.072	App. 0
Endocrine	0.791	1.027	1.222	2.250	3.041	7.0%
Gastrointest-inal	0.046	1.038	0.239	1.278	1.324	3.0%
Hepatobilino-genics	0.018	0.068	0.056	0.125	0.143	App. 0
Haemostatics	0.18 2	App.0	-	App.0	0.182	App. 0
Immunologic Agents	0.089	0.233	-	0.233	0.322	0.7%
Miscellaneous	0.122	0.545	0.092	0.638	0.760	App. 0
Ophthalmics	0.238	0.590	0.631	1.222	1.460	3.3%
Oroderetics	0.012	0.162	-	0.162	0.174	App. 0
Oto-Rhino	0.022	0.480	0.148	0.628	0.651	1.4%
Pulmonics	0.029	1.312	0.325	1.637	1.666	3.8%
Oxytocic	0.069	-	0.072	0.072	0.142	App. 0
Single Vitamins	0.0001	3.732	0.159	3.892	3.892	8.9%

Table 55 (Cont'd)

Therapeutic Group	Imported Drugs	Domestically Produced Drugs			Total	% to Total Consumption
		Local	Licensed	Total		
Complex Vitamins	0.001	2.767	-	2.767	2.769	6.9%
Minerals	0.0001	0.309	0.089	0.399	0.399	0.9%
Vitamins, Minerals	0.0001	1.389	0.016	1.406	1.406	3.2%
Lipotropics	0.0001	0.410	-	0.410	0.410	0.9%
Proteins	0.028	-	0.001	0.001	0.030	App.0
Blood Substitutes	0.028	0.287	0.532	0.819	0.848	1.9%
Neurosedatives	0.0001	0.193	0.134	0.327	0.327	0.7%
Tranquilisers	0.337	0.540	0.243	0.787	1.120	2.5%
Spasmolytics	0.024	0.570	0.705	1.275	1.299	2.9%
Urologics	0.122	0.716	0.149	0.865	0.988	2.2%
Vaginetics	0.047	0.187	0.002	0.190	0.238	0.5%
Milk infant diet	1.112	-	-	-	1.112	2.5%
Total Consumption	5.831	26.884	10.707	37.591	43.422	100.0%

BIBLIOGRAPHY

a) References in English

Books

L. Earle Arnow, Health in a Bottle, J. B. Lippincott Co., Philadelphia, 1970.

M. H. Cooper, Prices and Profits in the Pharmaceutical Industry, Pergamon Press, London, 1966.

Bent Hansen and Girgis A. Marzouk, Development and Economic Policy in the UAR (Egypt), North Holland Publishing Co., Amsterdam, 1965.

Bernard J. Keller, Jr., and Mickey C. Smith (eds.), Pharmaceutical Marketing, Baltimore: The Williams and Wilkins Co., 1969.

Matthew J. Kust, Foreign Enterprise in India: Laws and Policies, University of North Carolina, 1964.

Peter Mainhardt, Inventions, Patents and Trade Names, Gower Press Handbook, 1971.

F. M. Scherer, Industrial Market Structure and Economic Performance, Rand McNally and Co., Chicago, 1971.

George Teeling-Smith (ed.), Innovation and the Balance of Payments: the Experience in the Pharmaceutical Industry, (Office of Health Economics, London, 1967).

George Teeling-Smith (ed.), The Pharmaceutical Industry and Society, (Office of Health Economics, London, 1972).

R. Titmus, Social Policies and Population Growth in Mauritius, (with B. Abel-Smith), 1961.

John R. Vane, Evaluation of Drug Activities: Pharmacometrics, Academic Press, London and New York.

Articles

William S. Comanor, "Research and Competitive Product Differentiation in the Pharmaceutical Industry in the United States, Economica, November 1964.

William E. Cox, "Product Life Cycles as Marketing Models", Pharmaceutical Marketing, Op.cit.

E. D. Domar, "The Effect of Foreign Investment on the Balance of Payments", American Economic Review, 1950.

Richard C. Fenton, "Worldwide Ethical Drug Markets" Pharmaceutical Marketing, Op.cit.

Richard M. Furlaud, "Statement before Senate Subcommittee, Pharmaceutical Marketing, Op.cit.

Articles (cont'd.)

Walter Guzzardi, Jr., "The Untranquilized Drug Makers", Pharmaceutical Marketing, Op.cit.

Richard M. Hull, "Marketing Concepts", Pharmaceutical Marketing, Op.cit.

J. J. Ingola, "Is Ethical Drug Marketing in Step with Medical Practice?" Pharmaceutical Marketing, Op.cit.

Robert H. Jones, "The Modern Multinational Structure of the Pharmaceutical Industry", The Pharmaceutical Industry and Society, Op.cit.

Dr. Antoine T. Knoppers, "The Choice between Exports and Overseas Operations", The Wharton School of Finance and Commerce, University of Pennsylvania, Philadelphia, 1954-63.

A. Mason Harlow, "Pharmaceutical Marketing and the Public Interest in Perspective", Pharmaceutical Marketing, Op.cit.

Joseph D. McEvilla, "Price Determination Theory in the Pharmaceutical Industry", Pharmaceutical Marketing, Op.cit.

Walter Modell, "The Drug Explosion - An Editorial", Pharmaceutical Marketing, Op.cit.

Peter S. Mould, "The Pharmaceutical Industry and the Balance of Payments", The Pharmaceutical Industry and Society, Op.cit.

Edith T. Penrose, "International Patenting and the Less-Developed Countries", The Economic Journal, September 1973.

Christopher A. Rodowska, Jr., "Competition in the Pharmaceutical Industry," Pharmaceutical Marketing, Op.cit.

Henry Steele, "Patent Restrictions and Price Competition in the Ethical Drugs Industry", Journal of Industrial Economics, 1964.

C. V. Vaitsos, "Patents Revisited: Their Function in Developing Countries", Journal of Development Studies, October 1972.

Hugh D. Walker, "Market Power and Relative Prices in the Ethical Drug Industry", Econometric Society Papers, December 1967.

C. R. B. Williamson, "Exporting Pharmaceuticals", Innovation and the Balance of Payments: the Experience in the Pharmaceutical Industry, Op.cit.

F-D-C Reports, Drugs and Cosmetics, "The Pink Sheet", May 27, 1963.

The Economist, February 16, 1974.

Government Publications and International Reports

Gaps in Technology : Pharmaceuticals, Organisation for Economic Co-operation and Development, Paris, 1969.

Focus on Pharmaceuticals, National Economic Development Office, HMSO, London, 1971.

Government Publications and International Reports (cont'd.)

M. H. and A. J. Cooper, International Price Comparison - A study of prices of pharmaceuticals in the U.K. and eight other countries in 1970 - NEDO publication, London, 1972.

Reaching World Markets - A report on international marketing in the pharmaceutical industry - NEDO Publication, London, 1971.

A Sectoral Study on the Pharmaceutical Industry, UNIDO, E/CONF.54/R.B.P./2, United Nations, New York, 1966.

The Role of Patents in the Transfer of Technology to Developing Countries, United Nations, Doc. E/3861/Rev.1., New York, 1964.

The Pharmaceutical Industries in the Second Development Decade, United Nations Industrial Development Organisation, Secretariat (ID/WG.37/2), May 1969.

Establishment of Pharmaceutical Industries in Developing Countries - Report and Proceedings of Expert Working Group Meeting - UNIDO, ID/WG.37/3, May 1969.

H. Friebel, "Therapeutic Needs and Production of Drugs" - Paper presented to UNIDO meeting (ID/WG.37/6), 1969.

D. H. Wortzel, Technology Transfer in the Pharmaceutical Industry, UNITAR, Research Report No.14, New York, 1971.

C. V. Vaitsos, Transfer of Resources and Preservations of Monopoly Rents, Economic Development Report No.168, Harvard University, Cambridge, Mass., 1970.

C. V. Vaitsos, "Income Distribution, Welfare and Transnational Enterprise".

Report of the Committee of Enquiry into the Relationship of the Pharmaceutical Industry with the National Health Service, 1965-67, (Sainsbury Report), Cmnd. 3410, London, HMSO, 1967.

U.S. Senate Report, Administered Prices, Drugs, U.S. Government Printing Office, Washington, 1961.

b) References in Arabic (Selected)

Report on a Study in Health as a Productive Investment, Ministry of Health, Cairo, 1971.

The Pharmaceutical Industry, Central Agency for Public Mobilisation and Statistics, Cairo, 1967.

National Economic Indices, Part I, Financial Indices for Public Sector Companies (except Banks and Insurance Companies) for 1966/67, Ibid, Publication No. (711-01), Cairo, December 1969.

Egyptian Federation of Industries Yearbook, 1957-58, Cairo.

References in Arabic (Selected) (cont'd.)

The General Organisation for Pharmaceuticals, Pharmaceutical Chemicals and Medical Appliances, Index of Medical Specialities, 1969.

GOPCA, Final Reports on Following of Execution of Plans, 1968/69, 1969/70 and 1970/71.

Summary Report on Birth of GOPCA, Memo presented to Consultative Committee, GOPCA, 6 November, 1962.

The General Organisation for the Implementation of the Five Year Program for Industry, "The Economic Study of the Nasr project for Pharmaceutical Chemicals", 22 June, 1960.

Mohy El Din Al Azhary, Problems in Exporting Egyptian Drugs, a field study. Ph.D. Thesis in Business Administration, Faculty of Commerce, Cairo University, 1971.

Ahmad Aly Gaber, Problems of Domestic Distribution in the Pharmaceutical Industry. M.A. Thesis, Ein Shams University, 1973.

Mohamed Abd El-Moneim Said, Problems in the Measurement of Costs for the Purpose of Tariffication in the Pharmaceutical Industry. Project presented for Diploma in Costing, Cairo University, 1964.